MECHANICS' MAGAZINE,

AND

REGISTER OF INVENTIONS AND IMPROVEMENTS.

VOLUME VI.] NOVEMBER, 1835. [NUMBER 5.

FIRST ANNUAL FAIR OF THE MECHANICS' INSTITUTE.

GENERAL COMMITTEE OF ARRANGEMENTS:

SAMUEL CARTER,
JOHN BELL,
WILLIAM BALLARD,
JONAS HUMBERT, Jr.,
HENRY DURELL,
JOHN M. DODD,
N. S. HUNT,
GEORGE BRUCE,
JOHN THOMAS,
WILLIAM STEBBINS,
PETER WALTERS,
UZZIAH WENMAN,
L. D. GALE,
S. S. WARD,
WILLIAM BELCHER,
WILLIAM PARTRIDGE,
OLIVER WHITE,
G. L. PRICE,
SERENO NEWTON,
THOMAS GODWIN,
J. S. REDFIELD,
W. H. HALE,
JAMES WALTERS,
GABRIEL FURMAN,
JOHN N. BAUR,
ROBERT M. LANG,
JOHN CONROY,
O. G. WARREN,
DAN'L A. ROBERTSON,
HENRY CUNNINGHAM,
THOMAS TIMPSON,
JOHN STEELE, Jr.,
HENRY LUDWIG,
JAMES McBEATH,
JOHN REMICK,
G. D. KASHOW,
GEORGE SULLIVAN,
CHARLES BELCHER,
JOHN WINDT,
P. C. CORTELYOU,
COLIN LIGHTBODY,
WILLIAM NORRIS,
FITCH TAYLOR,
ADAM HALL,
ROBERT SMITH,
WILLIAM EVERDELL,
ALEX. MASTERTON,
L. D. CHAPIN,
WILLIAM FRISBY,
WALTER N. DE GRAW,
L. FEUCHTWANGER,
AUGUSTUS CAMPBELL,
SAMUEL BAILEY,
WM. L. CHURCHWELL,
ALEX. J. DAVIS,
W. J. MULLEN.

REPORT.

To the Mechanics' Institute of the City of New-York, the General Committee of Arrangements respectfully report:

That the first Annual Fair of the Institute was held at Castle Garden, and that the Exhibition was opened to the public on the 29th of Sept. and continued until the 3d of the present month inclusive, during which time they estimate that 40,000 of their fellow citizens visited the Garden.

Although free admission was given to the members of the Institute and depositors of goods, and cards of invitation issued to the judges, the municipal authorities of this city and the neighboring places, the gentlemen connected with the press, and numerous distinguished individuals, the total receipts amounted to $2,188, which it is believed will be found very nearly or quite sufficient to defray the expenses on that occasion, a detailed account of which will be presented as soon as the Sub-Committee on Finance shall have closed their labors. This result is more flattering than could have been anticipated, when it is recollected that a beautiful plate for printing diplomas and a pair of dies for striking medals have been procured, and are now the property of the Institute; an expense which will necessarily not again recur. Among other advantages to the Institute, the accession of rising 300 members may be enumerated.

The Committee must remark, that the quantity and variety of the articles exhibited, exceeded their most sanguine expectations, and that the quality reflected

the highest credit upon the skill and ingenuity of the contributors, and gave irresistible and gratifying evidence of the rapidity with which our country is advancing in the arts and in manufactures.

The Committee herewith submit notices of the various articles exhibited, and a list of the premiums that have been awarded. They have been prepared by their Sub-Committee on Premiums, and the attention of the Institute is invited to them.

Although the publication of these papers has been delayed for a longer period than was desirable, and many articles of merit have remained unnoticed in consequence of the want of information from contributors themselves, yet the Committee trust that the inexperience attendant upon, to them, a novel undertaking, will be considered a sufficient apology; and they feel assured that the valuable knowledge acquired in this first attempt will enable future Fairs to be conducted with greater pecuniary benefit to the Institute, and with increased interest to the public.

In presenting to you the results of our duties, and to the public a detailed exposition of the late Fair, it may not be irrelevant to the occasion to recall the cheering reflections arising from our present circumstances and future prospects.

It is impossible that we should not feel animated by the fact that our present number of active members *is more than one thousand*, and that the united energies of so large a portion of moral and intelligent citizens are, in their associate capacity, directed solely to the promotion of useful knowledge. Deeming knowledge both power and happiness, we should not be insensible to the influence which our efforts, well directed, may have upon our fellow citizens; nor can we think they will be unmindful of our objects and exertions. The diffusion of knowledge lays the foundation for every virtuous sentiment, and presents us with all the elements by which we are to be great or happy. Our means, derived from the public exhibition of American industry and individual contributions, concentrate in this great purpose, and we feel justified in anticipating a satisfactory result to ourselves, and an honor ableappreciation by the public.

Lectures upon the Sciences and the Arts, a *Reading Room* and *Library*, now mark the efforts of our Association and the discriminating patronage of our liberal minded citizens. Further and still more efficient means are in progress to diffuse useful information, and thereby to advance the interests of a most important part of the community. These interests are, however, unlimited, and every honorable man, approving the objects we propose, is invited to co-operate in the measures and share in the effects of this Association. On reviewing our condition, our objects, and our resources, we are induced to proceed with additional zeal, we are stimulated to increased exertions, and encouraged in every laudable hope.

SAMUEL CORTER, Chairman.
L. D. GALE, Secretary.

NOTICE OF THE VARIOUS ARTICLES EXHIBITED, COMPRISING THE PREMIUMS AWARDED.

MACHINERY, MODELS, PHILOSOPHICAL APPARATUS AND INSTRUMENTS.

No. 8. *Double Power Under Shot Water Wheel.* Invented by W. F. Brown. This Wheel is simple in construction, and works with very little friction. From the form and relative position of the flights, and an inclined shute under the wheel, the water is used in the most effectual manner. The wheel can be driven with very little head, and works well when completely submerged. By the addition of gates, it will answer a good purpose for tide mills. The Committee have awarded to the inventor the Silver Medal of the Institute.

No. 2. *Bromly's Portable Shower Bath.* Considered very useful and ingenious. The Diploma of the Institute.

No. 124. *Assay Balance.* Jones & McDonald, 83 Fulton street. Workmanship beautiful, and sensible to the 500th part of a grain, when loaded with ten penny weight. The Committee award to the manufacturers the Silver Medal of the Institute.

No. 258. *Machine for Making Sea Biscuit.* Deposited by J. & C. Bruce,

121 Bowery. A very excellent invention, for which the Silver Medal of the Institute has been awarded.

No. 212. *Shingle Machine.* Invented by D. Flagg, and deposited by S. S. Webster. The Machine consists of a frame to support the machinery, a gate working vertically, with a frow or knife to cut the shingles from the bolt; a vibrating beam attached to this and to a crank-shaft to work the knife up and down; two knives to shave the shingles, with screws and wedges to graduate their distances, and to secure them; a driver, working horizontally, to drive the shingle through between the knives attached to the wrist of the crank-shaft by a pitman. In operating, the shingle bolt is placed on the rest against the guide plates, and as the crank-shaft revolves the end of the vibrating beam is brought down, whilst its other end ascends with the gate and knife which cuts off the shingle, and the next half revolution of the crank forces forward the driver with the shingle, carrying it through the casing between the scoring saws and knives, where it is shaped and shaved.

With two or three horse power the Machine turns out from 120 to 150 shingles per minute, and probably without more waste of timber than by the common method. The Committee award the inventor the Silver Medal of the Institute.

No. 6. *A Continual Draft Buoyant Paddle Wheel.* By N. Dodge.

No. 26. *Centrifugal Pump.* By Isaac Sloan.

No. 1. *Patent Platform Scales.* By Fairbank. This appears to be a good article.

No. 29. *Model of a Weighing Machine.* By H. Bartley.

No. 31. 2 *Steamboat Models.* By John Clark.

No. 149. 1 *Platform Scale.* By John J. Rohr, 242 Canal street. The Diploma of the Institute.

No. 95. *Portable Grist Mill.* Invented by D. Fitzgerald. The Judges decided this Mill to be by far the best in its construction, and most convenient for use, they have ever become acquainted with, and the Committee have awarded the Silver Medal of the Institute.

No. 253. *Iron Grist Mill.* By Payne & Reynolds. In this Mill metal has been substituted in the parts where burr stone is commonly used. From its convenient size, and the rapidity with which it grinds corn, it promises to be very useful.

No. 201. *Model of a Grist Mill.* By I. Sloan.

No. 262. *Iron Threshing Machine.* By Wm. G. Borland, Herkimer, N. Y. Yale & Curtis Patentees.

No. 217. *Threshing Machine.* By S. F. Warren.

No. 286. *Threshing Machine.* By James Maxwell.

No. 243. *Rotary Air Pump, new plan; Electro-Magnetic Apparatus.* By Hiram French, of Lansingburgh. Both of these are very ingenious, and worthy of the Diploma of the Institute.

No. 245. *Double Thread Screw Press.* A very good contrivance.

No. 197. 1 *Copying Press*, 1 *Notarial Press.* Both of good workmanship. For exhibition, by Robert Hoe & Co. the makers.

No. 221. *Machine for Pressing Straw Hats.* By James Maxwell, 259 Bowery. Was considered by the Judges a very ingenious and valuable contrivance. The Committee have awarded to Mr. Maxwell the Silver Medal of the Institute.

No. 277. 1 *Cider Mill.* Justin Ware. Simple and good. The Diploma of the Institute has been awarded.

279. *Safety Ladder.* Invented by John Schriber. Simple in its construction, expeditious in its operation, and with the assistance of guys on each side to prevent the oscillations attendant upon great elevations, may be made very useful. The Committee have awarded the Diploma of the Institute to the inventor.

No. 42. 1 *Iron Safe*, made by Birkbeck & Co. Brooklyn, L. I. The Silver Medal of the Institute.

No. 76. 1 *Iron Safe*, by Cruttenden & Riley, Brookyn, L. I. The Diploma of the Institute.

No. 57. *Iron Safes*, by J. Delano. These were considered very good.

No. 37. *Moveable Platform Scale.* Cole & Smith. The principle of this Scale was pronounced very correct, and the workmanship excellent. The Committee, at the recommendation of the Judges, have awarded to the makers the Silver Medal of the Institute.

No. 190. *Model of Steam Safety Boiler.* Invented by G. R. Clarke. This consists

of a double boiler, one inclosed within another.

No. 33. *Model of an Apparatus for preventing explosions in Steam Boilers.* Invented by S. Kennedy, 22 Hudson street.

No. 236. *Machines for Morticing*, by George Page. One for cutting common mortices, and one for morticing Wheel Hubs. Both are very good and valuable machines. The Silver Medal of the Institute was awarded to the inventor.

No. 189. *Hydraulic Pump*, by Ridgeway & Co. A good article.

No. 120. 1 *Pump, Suction and Force*, by John Conroy.

No. 215. *Machine for Cutting Straw*, by H. Haxley & Co.

No. 176. *Model of a Rail Road Axle.* Deposited by D. K. Minor. Very ingenious, and promises to be useful.

No. 149. *Jack Screw*, by John J. Rohr, 242 Canal street. Very good.

No. 223. *Jack Screws*, by W. Ballard. Good articles.

No. 32. *Portable Forge and Bellows.* Fairley, Concklin & Co. Very excellent, and so constructed as to be removed with great facility. The Committee have awarded a Silver Medal.

No. 68. *Model of a Patent Bellows.* By C. D. Holmes. This is a neat wood model of a Square Bellows, blowing a stream of air, at both the up and down strokes, into a rising head. The intention of the inventor is to produce a steady blast—a desideratum in the arts. The workmanship of the model is quite creditable to the inventor; but the object to be attained, namely, a steady blast, will, we fear, be a failure. In practice it will be found that the blast will not be so strong at the end of the stroke, on change of motion, as it will when the piston is in the centre, or half way of the box. The Bellows now in use, to wit, leather Bellows, with rising head-tub or cylinder, will each of them produce quite as steady a blast as the one referred to. Probably the best way of producing a perfectly steady blast, is either by using a fan Bellows, or two or more cylinder Bellows, acting at half centres, blowing into a reservoir or rising head.

No. 41. *Model of a Patent Lithographic Printing Press.* By P. Langlume. For exhibition.

No. 38. 1 *Platinum Lamp, and Model of a Door Spring.* By F. Schott. The workmanship of the Lamp was good, and the price, $2, although above that required in the list of premiums offered, is less than the same article, of equal quality, has been previously sold at. The Committee have awarded to Mr. Schott a Diploma for the Door Spring, which is ingenious and well calculated for the purpose for which it is intended.

No. 35. 4 *Ploughs and Improved Windlass.* By Wiley, Concklin & Co. Peekskill. For the Windlass, the Silver Medal of the Institute has been awarded. It is neat and compact, and so constructed that the lever need not be removed, and therefore much time is saved in its operation.

No. 252. *Model Churn, Angevine's Patent.* Deposited by F. S. Lane. Considered good.

No. 134. *Washing Machine.* By Asa W. Soule. Thought to be a good article.

No. 265. *Model of a Machine for Polishing Plate Glass.* The property of the Institute.

No. 220. *Model of a Fire Engine.* L. Campbell.

No. 209. *Electrical Cannon, and Cylinder for Electrical Machine, also Model of a Steam Engine.* Jonas Humbert, jr. Deposited for exhibition.

No. 104. *Balance Level.* Invented by F. Bartholomew. Intended as a substitute for the common Spirit Level. Workmanship very good.

No. 91. *Dipping Needle, Transparent Compass, Circular Protractor.* By Brown & Hunt. The Dipping Needle has the pivots turned very fine, and acting on agates. The horizontal circle on which the instrument turns is divided into single degrees, and has opposite verniers to read to five minutes. Spirit Levels, with adjusting screws, are also attached. Both the action and workmanship of the instrument are very excellent. The Circular Protractor has opposite verniers to read to single minutes, with an additional arm to carry the Rack Work motion. This instrument, as well as the Transparent Mariner's Compass, is a beautiful specimen. The Committee have awarded to the makers a general premium of the Silver Medal, and for each of the articles noticed, the Diploma of the Institute.

No. 133. *A Barometer, Thermometer, Hydrometer, in one Case.* 10 *Thermometers*, 1 *Surveyor's Compass.* By John Roach, 3 Wall street. The Committee have a-

warded Mr. Roach a Diploma for the Compass, which is a well made instrument.

No. 289. *Printing Press of the New-York Transcript.* This Press is the Double Napier, improved by Mr. S. Newton, one of the firm of Robt. Hoe & Co. and was built for the Editors of the Transcript, by those enterprising gentlemen. The Press will run from 23 to 2500 impressions the hour, and was put in operation and the paper worked off every evening during the exhibition. The beauty of its operation attracted the attention of thousands of the visitors at the Fair. The Committee take this opportunity of making their acknowledgments to the Editors, Messrs. Hayward, Stanley & Co. for the kindness evinced by them in removing their press, at considerable expense, to the Garden, and they have no doubt that its exhibition contributed much to the gratification of visitors.

No. 71. *Armillary Sphere, or Problem Globe.* G. Vale, 84 Roosevelt street. Considered by the Committee of very great practical importance. The Diploma of the Institute.

No. 102. *An Extension Ladder, or Fire Escape.* John B. Gasner, 132 Chatham street, New-York City. Not having seen its practical operation, in cases of fire, the Committee are not prepared to speak of its utility; but if it can be made effective its advantages are incalculable. The inventor is entitled to great praise for so laudable an effort.

No. 103. *Model of a Brig.* George Slaughter, 7 Division street, New-York City. For exhibition.

No. 140. 2 *Artificial Legs.* James Kent, Brooklyn, N. Y. The Committee cannot, within the limits allowed them by this report, do justice to the skill and ingenuity of Mr. Kent in the manufacture of these articles. The application of artificial feet to the stumps, below the knee, having been tried and failing in Europe, the success of Mr. Kent will be duly appreciated, we believe, by a discriminating public. Lieut. Young having lost both feet, these artificial feet have been applied with complete success, so that the gentleman walks easily with the assistance of a cane only; he is a relative of Mr. Stoneall, Shakspeare Hotel. The Committee award the Silver Medal of the Institute for the Lady's Foot.

No. 207. 1 *Gig Patent Screw Boat—of Spanish Cedar.* Josiah Farr. This was uniformly admired for the beauty of its model, and its superior finish. The Committee are happy in awarding for so elegant an article, and one so deserving of competition in this City, the Silver Medal of the Institute.

No. 142. *Machine for Splicing Leather for Machine Cards.* Isaac Pierce. For exhibition.

No. 251. 2 *Magnets.* Jonas Humbert, jr. These were very powerful, and well made. For exhibition.

CHEMICALS.

No. 23. *Specimens of Polishing Powder. Do. Paste and Water Proof Paste.* To be reported upon and information communicated on trial.

No. 67. 4 *Boxes Austen's Patent Indian Rubber Oil Blacking.* Russel Austen, 113 Pearl street. Said to be water proof, and an excellent article for the preservation of leather. The judges, knowing its composition, can say with confidence that its materials will not injure leather, and from the specimens they have seen tried, they feel safe in inviting the public to make trial of the article.

No. 84. 3 *Bottles of Lemon Syrup.* Mr. Groening. The Syrup, the Committee think superior to any exhibited, and, indeed, of a most excellent quality. The Diploma of the Institute.

No. 94. *Samples of Plaster.* Duncan & Arthur, corner of Jane and West streets. Considered very good, but the Committee could not decide upon its merits in a powdered state, without a trial.

No. 96. *Chrystalized Prussiate of Potash.* Richard Brakell. Considered a most splendid specimen of chrystalization, and indicating great purity.

No. 110. 1 *Case of Perfumery, and* 2 *Glass Jars of Fancy Soap.* Johnson & Co. 39 Cedar street. The quality of these articles, generally, was the very best, and they were got up in elegant style. The Diploma of the Institute.

No. 118. 5 *Samples of Soap Stone Paint.* F. Bunker, 100 Barclay street, N. Y. This new article the Committee think bids fair to be very valuable in the arts; they therefore cheerfully recommend it to the public for a more particular trial of its merits.

No. 44. 1 *Dozen Lemon Syrup.* M.

of a double boiler, one inclosed within another.

No. 33. *Model of an Apparatus for preventing explosions in Steam Boilers.* Invented by S. Kennedy, 22 Hudson street.

No. 236. *Machines for Morticing*, by George Page. One for cutting common mortices, and one for morticing Wheel Hubs. Both are very good and valuable machines. The Silver Medal of the Institute was awarded to the inventor.

No. 189. *Hydraulic Pump*, by Ridgeway & Co. A good article.

No. 120. 1 *Pump, Suction and Force*, by John Conroy.

No. 215. *Machine for Cutting Straw*, by H. Haxley & Co.

No. 176. *Model of a Rail Road Axle.* Deposited by D. K. Minor. Very ingenious, and promises to be useful.

No. 149. *Jack Screw*, by John J. Rohr, 242 Canal street. Very good.

No. 223. *Jack Screws*, by W. Ballard. Good articles.

No. 32. *Portable Forge and Bellows.* Fairley, Concklin & Co. Very excellent, and so constructed as to be removed with great facility. The Committee have awarded a Silver Medal.

No. 68. *Model of a Patent Bellows.* By C. D. Holmes. This is a neat wood model of a Square Bellows, blowing a stream of air, at both the up and down strokes, into a rising head. The intention of the inventor is to produce a steady blast—a desideratum in the arts. The workmanship of the model is quite creditable to the inventor; but the object to be attained, namely, a steady blast, will, we fear, be a failure. In practice it will be found that the blast will not be so strong at the end of the stroke, on change of motion, as it will when the piston is in the centre, or half way of the box. The Bellows now in use, to wit, leather Bellows, with rising head-tub or cylinder, will each of them produce quite as steady a blast as the one referred to. Probably the best way of producing a perfectly steady blast, is either by using a fan Bellows, or two or more cylinder Bellows, acting at half centres, blowing into a reservoir or rising head.

No. 41. *Model of a Patent Lithographic Printing Press.* By P. Langlume. For exhibition.

No. 38. 1 *Platinum Lamp, and Model of a Door Spring.* By F. Schott. The workmanship of the Lamp was good, and the price, $2, although above that required in the list of premiums offered, is less than the same article, of equal quality, has been previously sold at. The Committee have awarded to Mr. Schott a Diploma for the Door Spring, which is ingenious and well calculated for the purpose for which it is intended.

No. 35. 4 *Ploughs and Improved Windlass.* By Wiley, Concklin & Co. Peekskill. For the Windlass, the Silver Medal of the Institute has been awarded. It is neat and compact, and so constructed that the lever need not be removed, and therefore much time is saved in its operation.

No. 252. *Model Churn, Angevine's Patent.* Deposited by F. S. Lane. Considered good.

No. 134. *Washing Machine.* By Asa W. Soule. Thought to be a good article.

No. 265. *Model of a Machine for Polishing Plate Glass.* The property of the Institute.

No. 220. *Model of a Fire Engine.* L. Campbell.

No. 209. *Electrical Cannon, and Cylinder for Electrical Machine, also Model of a Steam Engine.* Jonas Humbert, jr. Deposited for exhibition.

No. 104. *Balance Level.* Invented by F. Bartholomew. Intended as a substitute for the common Spirit Level. Workmanship very good.

No. 91. *Dipping Needle, Transparent Compass, Circular Protractor.* By Brown & Hunt. The Dipping Needle has the pivots turned very fine, and acting on agates. The horizontal circle on which the instrument turns is divided into single degrees, and has opposite verniers to read to five minutes. Spirit Levels, with adjusting screws, are also attached. Both the action and workmanship of the instrument are very excellent. The Circular Protractor has opposite verniers to read to single minutes, with an additional arm to carry the Rack Work motion. This instrument, as well as the Transparent Mariner's Compass, is a beautiful specimen. The Committee have awarded to the makers a general premium of the Silver Medal, and for each of the articles noticed, the Diploma of the Institute.

No. 133. *A Barometer, Thermometer, Hydrometer, in one Case.* 10 *Thermometers*, 1 *Surveyor's Compass.* By John Roach, 3 Wall street. The Committee have a-

warded Mr. Roach a Diploma for the Compass, which is a well made instrument.

No. 289. *Printing Press of the New-York Transcript.* This Press is the Double Napier, improved by Mr. S. Newton, one of the firm of Robt. Hoe & Co. and was built for the Editors of the Transcript, by those enterprising gentlemen. The Press will run from 23 to 2500 impressions the hour, and was put in operation and the paper worked off every evening during the exhibition. The beauty of its operation attracted the attention of thousands of the visitors at the Fair. The Committee take this opportunity of making their acknowledgments to the Editors, Messrs. Hayward, Stanley & Co. for the kindness evinced by them in removing their press, at considerable expense, to the Garden, and they have no doubt that its exhibition contributed much to the gratification of visitors.

No. 71. *Armillary Sphere, or Problem Globe.* G. Vale, 84 Roosevelt street. Considered by the Committee of very great practical importance. The Diploma of the Institute.

No. 102. *An Extension Ladder, or Fire Escape.* John B. Gasner, 132 Chatham street, New-York City. Not having seen its practical operation, in cases of fire, the Committee are not prepared to speak of its utility; but if it can be made effective its advantages are incalculable. The inventor is entitled to great praise for so laudable an effort.

No. 103. *Model of a Brig.* George Slaughter, 7 Division street, New-York City. For exhibition.

No. 140. 2 *Artificial Legs.* James Kent, Brooklyn, N. Y. The Committee cannot, within the limits allowed them by this report, do justice to the skill and ingenuity of Mr. Kent in the manufacture of these articles. The application of artificial feet to the stumps, below the knee, having been tried and failing in Europe, the success of Mr. Kent will be duly appreciated, we believe, by a discriminating public. Lieut. Young having lost both feet, these artificial feet have been applied with complete success, so that the gentleman walks easily with the assistance of a cane only; he is a relative of Mr. Stoneall, Shakspeare Hotel. The Committee award the Silver Medal of the Institute for the Lady's Foot.

No. 207. 1 *Gig Patent Screw Boat—of Spanish Cedar.* Josiah Farr. This was uniformly admired for the beauty of its model, and its superior finish. The Committee are happy in awarding for so elegant an article, and one so deserving of competition in this City, the Silver Medal of the Institute.

No. 142. *Machine for Splicing Leather for Machine Cards.* Isaac Pierce. For exhibition.

No. 251. 2 *Magnets.* Jonas Humbert, jr. These were very powerful, and well made. For exhibition.

CHEMICALS.

No. 23. *Specimens of Polishing Powder. Do. Paste and Water Proof Paste.* To be reported upon and information communicated on trial.

No. 67. 4 *Boxes Austen's Patent Indian Rubber Oil Blacking.* Russel Austen, 113 Pearl street. Said to be water proof, and an excellent article for the preservation of leather. The judges, knowing its composition, can say with confidence that its materials will not injure leather, and from the specimens they have seen tried, they feel safe in inviting the public to make trial of the article.

No. 84. 3 *Bottles of Lemon Syrup.* Mr. Groening. The Syrup, the Committee think superior to any exhibited, and, indeed, of a most excellent quality. The Diploma of the Institute.

No. 94. *Samples of Plaster.* Duncan & Arthur, corner of Jane and West streets. Considered very good, but the Committee could not decide upon its merits in a powdered state, without a trial.

No. 96. *Chrystalized Prussiate of Potash.* Richard Brakell. Considered a most splendid specimen of chrystalization, and indicating great purity.

No. 110. 1 *Case of Perfumery, and* 2 *Glass Jars of Fancy Soap.* Johnson & Co. 39 Cedar street. The quality of these articles, generally, was the very best, and they were got up in elegant style. The Diploma of the Institute.

No. 118. 5 *Samples of Soap Stone Paint.* F. Bunker, 100 Barclay street, N. Y. This new article the Committee think bids fair to be very valuable in the arts; they therefore cheerfully recommend it to the public for a more particular trial of its merits.

No. 44. 1 *Dozen Lemon Syrup.* M.

PAGINATION INCORRECT

Haulenbeck, 144 Nassau street. Considered of excellent quality.

No. 196. *Lucifer Matches.* Hopper, 364 Broadway. For exhibition.

No. 158. 1 *Bottle of Writing Ink.* Noble Heath, No. 8 Hester street. The Committee think this the best ink they have ever seen, and they recommend it to public notice. A remarkable property of this ink is that it presents, when used on cards, &c. all the prismatic rays; it is really quite unique, and of surpassing beauty. The Diploma of the Institute.

No. 202. 1 *Box Allum*, 1 *do. Saltpetre*, 1 *do. Copperas*, 1 *do. Oil Vitriol.* Messrs. E. Peck & Son. The Copperas the Committee consider of a superior quality, and not surpassed by any ever manufactured. The Nitre was thought to be of the best quality also, but the Committee could not well determine its purity. The Oil of Vitriol was excellent. The Diploma of the Institute.

No. 124. *Chemical Preparations.* Dr. Lewis Feuchtwanger, Broadway, New-York City. The great variety of Chemical and Medicinal preparations here presented for exhibition, attracted the particular attention of the Committee, and they would say, in general terms, that the preparations were of great purity and usefulness, and worthy of special notice. The indefatigable industry of Mr. F. in manufacturing Chemicals, hitherto imported, many of which are superior to the foreign article, will, we trust, be duly appreciated by the public.

No. 39. 1 *Box of White Lead.* E Clark, Saugerties, N. Y. This specimen was considered equal, if not superior, to any in the country. The great purity of an article so worthy of competition, induces the Committee to award the Silver Medal of the Institute.

No. 271. 1 *Can of Copal Varnish.* Wm. Tildon. To be tested and reported upon.

No. 182. 1 *Can of Coach Varnish.* P. B. Smith. To be tested and reported upon hereafter.

No. 206. 2 *Bottles of Ink, and* 1 *Frame.* F. B. Callender.

BOOTS, SHOES, LASTS, AND LEATHER.

No. 36. *Ladies' Boots and Shoes.* F. S. & M. Morris, 388 Grand street, N. Y.

No. 63. 1 *Pair Dancing Pumps.* J. Field, Newark, N. J. Considered of excellent quality.

No. 69½. *Gentlemen's Gaiter Boots.* Lewis J. Durand, 159 Centre street. Best exhibited. The Diploma of the Institute.

No. 70. *Ladies' Slips and Wadded Boots.* John Broqua, 331 Broadway, New-York City. The Committee consider the Wadded Boots the best article exhibited. The Diploma of the Institute.

No. 83. *Children's Pumps, Sandal Slips, and Misses' Gaiter Boots.* Thomas Weeks, 157 Delancy street. For the best pair of Misses' Gaiter Boots and Sandal Slips, the Committee awarded the Diploma of the Institute.

No. 106. 1 *Pair Light Boots*, 1 *Pair Light Pump Boots*, 1 *Pair Cork Sole Pump Boots*, 1 *Pair Double Cork Sole Pump Boots*, 1 *Pair Dancing Pumps*, 1 *Pair Opera Pumps.* Kimble & Rogers, 104 Broadway, New-York City. The light boots and dancing pumps the Committee consider the best exhibited; they therefore award the Diploma of the Institution.

No. 135. 14 *Pair Moccasins.* Mrs. Nichols, 106 Chatham street. These were considered very good by the Committee, and worthy the Diploma of the Institute.

No. 138. 2 *Boxes of Lasts.* G. Coit & Sons, 305 Pearl street. The Gentlemen's Boot Lasts were the best offered, and thought worthy the Diploma of the Institute.

No. 145. *Ladies' Gaiter Boots and Slippers.* Made by W. J. Watson, 67 Fulton street, Brooklyn, N. Y. The best exhibited. The Silver Medal and Diploma of the Institute.

No. 160. 1 *Pair Double Sole Water Proof Boots.* Robert Walker, 44 Greenwich street. These were the second best exhibited, and of an excellent quality.

No. 191. 4 *Pairs Water Proof Boots.* Henry Brisch. These were considered by the Committee most excellent water proof articles. The Diploma of the Institute.

No. 51. *Ladies' Gaiter Boot Lasts.* Deposited by C. R. Williams, 62 Frankfort street. Considered the best offered. The Diploma of the Institute.

No. 194. 1 *Side of Sole Leather.* Wm. Brown, Brooklyn. This was of an excellent quality, and an article the Committee were pleased to see offered for competition. The Diploma of the Institute.

No. 107. 1 *Double Sole Boot*, 2 *Light do. and* 1 *Shoe.* C. B. & J. C. Green, 416 Broadway. Very good workmanship.

No. 204. 1 *Case*, 2 *Pair of Boots.* Robert Webber.

No. 210. 1 *Case Ladies' Shoes.* Benjamin Shaw.

No. 62. 1 *Pair of Dancing Pumps.* E. Severance, Newark, N. J.

No. 211. 3 *Lasts.* Wm. Shaw.

HATS, CAPS, AND FURS.

No 69. 1 *Case of Water Proof Hats.* Edward Townley, 148 Canal street.

No. 111. 3 *Silk Hats.* G. B. Alvord, 12 Bowery. These specimens were of a superior quality, and received the special notice of the Committee. For the best $3.50 Hat they award the Silver Medal of the Institute.

No. 114. 1 *Silk Hat.* Isaac M. Henderson, 133 Lewis street.

No. 92. 1 *Case of Otter Ladies' Caps*, 1 *do. Gentlemen's, and* 1 *do. Misses.* Charles C. Plaisted. The Committee consider these articles worthy of particular notice, and recommend Mr. Plaisted's work to the patronage of the public.

No. 163. 1 *Satin Beaver Lady's Hat*, 3 *Drab do. do.* S. Tuttle, 208 Chatham street. The Committee thought these, from the elegance of their finish, deserving the Diploma of the Institute.

No. 233. 3 *Straw Hats.* Mrs. Harrison, 43½ Division street. The ladies merit particular attention in the specimens of mechanical skill which they present for exhibition to the public, and the Committee are happy to find that attention so well deserved, as in Mrs. Harrison's Hats. The extreme fineness of the braid, the charming neatness with which they were sewed, and this perfection of the model, though unpressed, entitles this lady, in their opinion, to the Silver Medal of the Institute.

No. 238. 1 *Russia Silver Fox Boa*, 1 *Siberian Blue Ice-Fox do.*, 1 *do. Squirrel Cape*, 1 *do. Blue Fox do.* Christian G. Gunther. Considered very beautiful, and finely made. The Diploma of the Institute.

No. 248. 2 *Fur Hats.* A. & A. Barker. The Committee have thought these highly creditable specimens of workmanship, and therefore award the Diploma of the Institute.

No. 261. 2 *Ladies' Hats.* B. J. & J. W. Hunt. These were beautiful specimens of Ladies' Beaver Hats, and worthy the Diploma of the Institute.

No. 143. 4 *Otter Caps.* James Latourette, Pearl street. These were specimens of great superiority, and were not excelled by any exhibited, if they can be equalled in the country. The Committee cheerfully award the Silver Medal of the Institute.

GOLD AND SILVER ARTICLES.

No. 43. *A Case of Watch Dials.* William J. Mullen, New-York City. The Committee consider these specimens of American workmanship worthy of special notice, both for originality of design and elegance of workmanship. They have never been equalled by any articles of the kind, foreign or domestic; and when it is considered that heretofore a large sum of money has been sent abroad annually for these articles, the Committee feel at liberty to express unqualified praise in favor of the articles here exhibited; they therefore award to Mr. Mullen the Silver Medal of the Institute.

No. 52. 19 *Articles manufactured of Argentine, or German Silver.* H. Powell, Belleville, New-Jersey. These articles were of superior workmanship. The Silver Medal of the Institute.

No. 127. 1 *Case Pencil Cases*, (*No. 42, Ever Point.*) Woodward & Hale. Some of these evinced a most elegant style of workmanship, whilst the patterns were of the most chaste and approved kinds.

No. 184. 1 *Case of Spectacles.* J. L. Moore, 142 Chatham street. Considered neat and elegant patterns, and very finely wrought. The Diploma of the Institute.

No. 213. *Patent Lever Temple Spectacles.* P. Williamson, 270 Division street. These are an improvement of the ordinary Spectacle Frame, by means of the intersecting levers of which the temple part is composed. The levers being about one inch in length, are made circular, so that when riveted to each other, they are adapted to the conformation of the head. The whole arrangement of levers gives to these spectacle bows great elasticity and uniformity of action, and is, withal, very neat and novel. The Diploma of the Institute.

No. 228. *Gold and Silver Thimbles,*

and Spectacles. Platt & Brothers. The patterns of the Thimbles were much admired, and the Spectacle Bows were highly distinguished for their neatness, convenience, and elegance of finish. The Committee awarded the Diploma of the Institute.

" No. 242. 2 *Bars of German Silver,* 2 *Rolls do. do.* Dr. Spieker, 191 William street, N. York. Considered by the Committee a valuable article, and capable of being appropriated to a great variety of useful domestic purposes: these specimens were of the finest quality. The Diploma of the Institute.

No. 205. 24 *Watch Dials.* Berger Webster & Co. These were a beautiful article, and thought by the Committee worthy of the Diploma of the Institute.

INDIAN RUBBER ARTICLES.

" No. 123. 2 *Pair Indian Rubber Boots,* 1 *do. Shoes,* 1 *Knee Cap,* and 1 *Shoulder Cap.* Stephen C. Smith, 66 Chatham street. Many of these articles were considered by the Committee of superior quality, and particularly *the Ladies' Shoes,* from the admirable manner in which the cloth linings were incorporated with the rubber, so as to prevent them from becoming troublesome to the wearer, as they often do by being detached from the shoe. This is an invention of Mr. Smith's, and one which he applies with equal success to boots and clothing. The Diploma of the Institute.

No. 59. 17 *Pairs of Indian Rubber Shoes,* also 1 *piece Virgin Rubber,* and 1 *Sheet.* Corning & Son, 144 Water street. Considered of an excellent quality.

No. 179. *Machinery Banding, Stage Thorough Brace, and Gas Bag of Indian Rubber.* H. Raymond & Co. The superior excellence, and practical advantage, of the first named articles, entitle the gentlemen, as the Committee think, to the Silver Medal of the Institute.

No. 216. *Specimens of Indian Rubber.* Charles Goodyear, 13 Gold street. The Committee are of the opinion that of all the useful modifications and applications of this article, none exceeds, in novelty or utility, that discovered by Mr. Goodyear. The original coloring matter, by a process peculiarly his own, is removed from the material, and any other given to it, whilst, at the same time, it is deprived of all of its unctuous and aqueous qualities, and yet retains its elasticity, durability, and imperviousness. The Committee can have no doubt of the utility and success of this discovery, and therefore recommend it to the immediate attention of the public. The Silver Medal of the Institute.

No. 232. 1 *Roll Indian Rubber,* 1 *Coat and Pantaloons of do.* Samuel Chase.

No. 272. *Case of Indian Rubber Balls.* H. Percival & Co. Considered very good, and handsomely made.

CABINET FURNITURE.

No. 9. *Camp-Bed and Table,* (inclosed in the lid of a trunk.) Wm. W. Woolley, Broadway, New-York City. Considered remarkably convenient and ingenious. It will, no doubt, be in great demand, particularly with travellers. The Silver Medal of the Institute.

No. 40. 1 *Lady's Work Box.* John F. Hanson, 57 Poplar street, Brooklyn, N. Y. First rate workmanship. The Diploma of the Institute.

No. 108. 1 *White Polished Door.* Solomon Pancoast, 54 Spring street, New-York City. This was an elegant article, and its beautiful finish was particularly admired. The Diploma of the Institute.

No. 125. 1 *Lady's Work Box.* Edward Senior, 138 Bleecker street. Considered a good specimen of workmanship.

No. 81. *Lady's Work Box.* A. Patterson.

No. 171. 1 *Centre Table, Mosaic top.* Wm. Fulcher, 88 Elm street. An elegant article, and worthy the Diploma of the Institute.

No. 187. 1 *Sofa Bedstead.* Francis Breckles. Considered by the Committee the best specimen offered, and really of superior excellence. They award to the maker the Silver Medal of the Institute.

No. 193. 1 *Breccia Top Centre Table —Column of Marble.* Wm. Vine. The Diploma of the Institute.

No. 287. 1 *Sofa and* 1 *Centre Table.* S. Carter, 51 Beekman street. For exhibition.

No. 144. 1 *Portable Desk.* Lawrence Ryer. For exhibition.

No. 154. 1 *Sofa Bedstead.* W. Woolley, Broadway, New-York City. In Mr. Woolley's good style of workmanship.

No. 237. 1 *Divan Bedstead and Royal Foot Rest.* W. Woolley.

CUTLERY, EDGE TOOLS, AND HARDWARE.

No. 7. 2 *Pounds Bright Wire—six miles long.* 1 *do. fine do.* 1 *Bundle Square Wire,* and 1 *do. Round do.* No. 12, *Copper.* From E. Peck & Son, New-York City. Considered wrought in a superior manner. The Silver Medal of the Institute for the 2 lbs. bright wire.

No. 82. 62 *Gross Wood Screws.* Goodell & Co. Newburg, N. Y. The Diploma of the Institute.

No. 82¼. *Four Plumb Spirit Levels.* J. & H. M. Pool, Easton, Mass. N. B. The Messrs. Pools are the inventors of this valuable instrument, and secured the patent in 1833. Too much credit cannot be awarded to these enterprising gentlemen, for their useful invention. The Silver Medal of the Institute.

No. 82½. 5½ *dozen Shovels and Spades.* Deposited by Mitchell Ames & Co. No. 2 Liberty street. Considered very good.

No. 98. 14 *Pairs Shears.* Rochus Heinisch. The specimens exhibited were of superior workmanship and finish, and deserving public notice. The Silver Medal of the Institute.

No. 112. 1 *Case of Stocks and Dies.* Daniel B. King, Waterford, N. Y. The Committee are of the opinion that these are equal, if not superior, to any of the kind in the country. They award the Silver Medal of the Institute.

No. 80. *Invoice of Files.* George Rothery, Bloomfield, N. J. Many of these were considered equal to any imported, doing much credit to the manufacturer, by so successful a competition with the foreign article. The Silver Medal of the Institute.

No. 132. 1 *Case Steel Pens.* C. Atwood, 72 Maiden Lane. Considered very good in style and execution. The Diploma of the Institute.

No. 141. 6 *Dirk Knives.* Robert Ward. The Committee think these specimens of workmanship have great elegance and perfection. They award the Diploma of the Institute.

No. 167. 4 *Bundles of Iron Wire.* E. Peck & Son. These specimens were thought by the Committee to be of superior quality and workmanship.

No. 268. 2 *Augers.* Upson & Campfield, Humphreysville, Ct. These were superior articles, doing much credit to the manufacturers.

No. 269. 9 *Auger Bits.* Clark & Hartshorn, Humphreysville, Ct. These articles have been brought to great perfection by the makers.

No. 274. *One Case of Stocks, Dies and Taps.* I. Sloat. The Committee considered these very good, and awarded the Diploma of the Institute.

No. 276. 1 *Set of Coach Springs.* Henry C. Jones, Newark, N. J. A superior article, and entitled to the particular attention of the public, as well as the Silver Medal of the Institute.

No. 173. *Traphining Instrument, and* 4 *Pairs of Razors.* C. A. Zeitz. The Surgical Instrument here exhibited is certainly a very beautiful specimen of workmanship. The absence of the ingenious inventor prevented a better knowledge of its applicability. The notice of the professors of surgery is invited to it. The Committee award the Silver Medal of the Institute.

No. 177. 4 *Boards of Brass Ware.* M. W. & J. A. Emmons. For the excellence of this Ware the Committee award the Diploma of the Institute.

No. 200. 1 *Concave Screw Auger.* Wheeler & French, 18 Pine street. The Committee consider this a very valuable article, and one which they cannot commend too highly to public notice. They award the Silver Medal of the Institute.

No. 214. *Patent Graduated Diamond-Point Pens.* George Williamson, 270 Division street.

No. 250. 1 *Clock Main Spring,* 2 *Chronometer do.* 1 *Lever and* 1 *Lepine do.* Desaules & Clerc, 27 Madison street. These were most excellent specimens of American workmanship, equal, if not superior, to any imported. The manufacturers should be patronized in this new article. The Diploma of the Institute.

MUSICAL INSTRUMENTS.

No. 60. 1 *Grand* 7 *Octave Piano Forte,* and 1 *do.* 6 *Octave do.* Bridgeland & Jardine, 338 Bleecker street; sold by Otto Torp & Co. Broadway. The latter of these was distinguished for mellowness and sweetness of tone, and considered the second best exhibited; for which the Committee awarded the Diploma of the Institute.

No. 89. 1 *Piano Forte—grand action.* John Abbot, 66 Walker street. The Silver Medal of the Institute. The Committee consider this instrument possessed of great brilliancy of tone, pleasant touch, and made in a superior manner.

No. 151. 1 *Bass Double-slide Trombone,* 1 *Kent or Keyed Bugle,* 1 *Keyed Trumpet,* 1 *Tenor Trombone, and* 1 *Slide Trumpet.* John Rosenberk, Utica, N. Y. Though there was no competition in these articles, the Committee are gratified in stating that, in addition to their own judgment, they have that of some of the best performers in this or any other country, for saying that these specimens have never been surpassed by any of the kind, either for tone or workmanship. They award the maker the Silver Medal of the Institute.

No 165. 1 *Piano Forte*—clutch-round cornered. A. G. Smith.

PRINTING AND BOOK BINDING.

No. 20. *Fancy Card Printing.* By C. L. Adams. These were uncommonly beautiful specimens, and quite equal to engraving. The Diploma of the Institute.

No. 49. *Specimens of Xylographic Engraving.* Wright & Prentiss, 45 Maiden Lane. Considered beautiful specimens of the art. The Silver Medal of the Institute.

No. 65. 1 *Rotary Printing Press—for Cards.* Charles F. Voorhies, Newark, N. J. The Committee think this Press extremely ingenious, and admirably adapted for the printing of Cards. The originality displayed in the invention, and the rapidity with which it executes work of this kind, is deserving of general, as well as of our own particular notice. The Silver Medal of the Institute.

No. 117. 6 *Blank Books.* David Felt, 245 Pearl street. The specimens of Binding here exhibited are of superior order in the taste with which they are got up, the elegance of their style, and the strength of their workmanship. The spirit of enterprise manifested by the manufacturer, in producing specimens like these, the Committee think deserving special notice from the public. They award the Silver Medal of the Institute.

No. 126. 5 *Boxes Printing Ink.* M. P. Prout, 63 Spring street. These specimens are so well known as not to need commendation from the Committee.

No. 25? 1 *Printing Press.* James Maxwell, 259 Bowery, N. York. Considered an excellent press both for the perfection of its work, and its simplicity.—The committee were much pleased with it, and awarded the Diploma of the Institute.

No. 148. 4 *Specimen Books of Types,* 16 *Pages of Types, and a Furnace in use casting Types.* George Bruce & Co. New-York City. These books exhibited the great perfection and beauty to which these manufacterers of types and typographical ornaments and illustrations have brought the art.

No. 254. *Specimens of Bookbinding.*—Coolidge & Lambert, 65 Wall street.—These were very good specimens of work.

No. 109. 1 *Bible.* Charles A. Focke. For exhibition.

No. 273. 2 *Composition Rollers.* J. Thomas. For exhibition.

FINE AND ORNAMENTAL ARTS.

No. 3. *Astral Lamp, Candlesticks, Writing Stands, Portrait Frame, Shirt Studs, &c., &c., made of Anthracite Coal.* From E. W. Kirk, 233 Chesnut street, Philadelphia. By Anderson & Ward. The Silver Medal of the Institute. These specimens were considered by the Committee superior, in point of workmanship, to any articles of the kind ever exhibited in this country.

No. 10. *Imitation of Quincy Granite.* A. Kent, 100 Concord street, Brooklyn, N. Y. A very fine specimen of imitation.

No. 15. 2 *Pieces of Sculptured Quincy Granite.* A. Lawrence. Very good workmanship. The Silver Medal of the Institute.

No. 16. *Pantographic Drawing of Chief Justice Marshal.* Wm. L. Ormsby, 142 Nassau street, New-York City. Considered of superior merit. The Diploma of the Institute.

No. 19. *Transparencies and Blind.* W. I. Hannington. Considered extremely beautiful. The perfection to which Mr. Hannington has brought this art does him great credit. The Committee have awarded the Silver Medal of the Institute.

No. 22. *Ionic Capitals*—two specimens of Carving in Wood. Luff &, Monroe, 105 Elm-st. New-York City. Finely

executed. The Diploma of the Institute.

No. 25. 12 *Specimens of Penmanship.* By Isaac Goward. Exhibiting much industry.

No. 46. 19 *Specimen Imitations of Rosewood, Mahogany, Marble, &c.* The *Mosaic Table Top,* in this collection, was inimitably fine, and worthy of the admiration uniformly expressed by visitors. Executed by George Bird, 94 Anthony street. The Silver Medal of the Institute.

No. 48. *Two Framed Designs.* By G. Thomas, 37 Canal street, New-York. The one representing a magnificent Viaduct and Bridge across the East River, from Brooklyn to New-York, the Committee think indicative of no ordinary talent in the young artist, by whom it was executed. The Bridge is supposed to have a row of Stores on either side; and the abutments and arches, 6 in number, to be of granite, except the central one, which is designed to be of cast iron, 180 feet high.

No. 61. 1 *Painting of a Dog's Head.* William Malbone. The Committee considered this a picture of superior merit, exhibiting great freedom in penciling and boldness of touch, for which they award the Silver Medal of the Institute.

No. 64. 1 *Painting of St. John.* John Alebon, 94 Anthony street, New-York City. The execution of this was thought to be good.

No. 74. *Framed Specimen of Carving.* Mr. Heron, 419 Water street—Frame executed by Mott & Stuart. The ornamental work is very ingeniously wrought, and with much labor.

No. 84½. 3 *Framed Engravings.* Geo. Endicott, 359 Broadway. Considered very spirited Drawings, and well executed. The Diploma of the Institute.

No. 88. *Framed Samples of Clinton's Patent Cement.* Deposited by N. H. Gale.

No. 116. 11 *Specimens of Penmanship.* John W. S. Mackie. The Committee are of the opinion that Mr. Mackie's specimens of writing are distinguished by a free and intelligible style.

No. 246. 1 *Framed Drawing, City Hall, Brooklyn, N. Y.* Wm. Brown.—This Drawing did the artist much credit, particularly on account of its shading.

No. 222. 1 *Vase of Shell Work.* John Lee. The Diploma of the Institute. The Committee are induced to invite public attention to this article, from the great merit it is said to possess, by those who have used it, for the walls of buildings; inasmuch as it is both very beautiful and lasting. From its great hardness, it is susceptible of being washed, like marble, without affecting its polish. Patented. Mr. Charles Clinton, West Town, Orange co. N. Y.

No. 93. 1 *Specimen of Needle Work,* (Mater Creatoris,) 1 *Bell Rope* and 1 *Lamp Stand.* Mrs. Hardrop, 3 Roosevelt street. The first of these articles, wrought with silk by the needle, is considered by the Committee of extraordinary merit; exhibiting both great skill and uncommon industry. They are not surprised that it received, as it deserved, the uniform expressions of admiration from the visitants at the Fair: they therefore award to the lady the Silver Medal of the Institute.

No. 113. *Case of Shell Work and Birds.* John Lee, 271 Broadway, New-York City. These specimens of ingenious workmanship the Committee consider very flattering evidences of the taste and skill of the artist; they therefore award the Diploma of the Institute.

No. 119. *Specimens of Penmanship.* William Jones, 183 Broadway. The style of these specimens is particularly free and bold, and, in these respects, worthy of special notice.

No. 183. 1 *Large Glass Punch Bowl.* Birch & Scarlett, 12 Liberty street. This massive article, from the truly beautiful manner in which it was cut, and the richness of its pattern, was particularly admired by all who saw it. The Committee take pleasure in awarding the Diploma of the Institute.

No. 147. *Pedestal of Scagliola.* Patrick Foley. The almost perfect resemblance of this to marble, both in touch and color, with the beautiful polish which it possesses, has received particular attention from the Committee. The Diploma of the Institute.

No. 153. *Statue of Napoleon Bonaparte, in Brown Stone.* David White, 80 Charlton street. The execution of this specimen of sculpture, by a journeyman stone cutter, does the artist much credit.

No. 156. 1 *Case of Artificial Teeth.* James Alcock. The Committee were particularly attracted to these specimens of a useful and ornamental art, by the

great perfection of the enameling; a point not sufficiently considered in estimating the value of artificial teeth. They award the Diploma of the Institute.

No. 157. *Specimens of the Mending of Lace.* Mrs. Heath, No. 8 Hester street. It is with no common satisfaction the Committee recommend this art to public notice. The rents in the specimens exhibited, though large, could scarcely be detected by the closest examination. The Diploma of the Institute.

No. 162. *Specimens of Pantographic Engraving.* T. S. Woodcock. These specimens prove that this valuable branch of the arts, though somewhat new, has been brought to a degree of elegant perfection. The Committee award the artist the Silver Medal of the Institute.

No. 178. 2 *Framed Drawings.* J. Davis. The taste and art displayed in these Architectural Drawings, together with the effective management of the lights and shades, readily show them to have come from the hand of a skilful artist. The Diploma of the Institute.

No. 192. 1 *Colossal Bust of McDonald Clarke.* James V. Stout. The truth of the likeness, and the superior finish of this specimen of modelling, the Committee think entitles this to more than ordinary notice. It will have appeared to all who have seen it that, in addition to the likeness and finish, it is in perfect keeping, and replete with the spirit of life. It has not been surpassed, if equalled, by any specimen of the kind in the country. The fact that this is the second effort at modelling from life by this young artist, and yet that the relative proportions, the character and perfection of anatomical developement, has been so wonderfully preserved in every delineation, goes further to prove his talents in the minds of mature judges, than our public expression of praise. The Silver Medal of the Institute.

No. 195. *A Bank Note Plate.* C. P. Harrison. Considered good.

No. 219. 6 *Specimens of Scagliola.* J. W. Clark. These specimens were extremely beautiful, and particularly admired by the Committee for the variety of their colors, and for the ornamental purposes to which the article may be applied. They award to the manufacturer the Diploma of the Institute.

No. 231. 2 *Vases of Artificial Flowers, made of Feathers.* J. B. Fisk, Brooklyn, N. Y. The Committee would make mention of these beautiful specimens, for the almost perfect resemblance they have to the natural flower; they display much ingenuity and skill.

No. 241. 1 *Framed Specimen of Needle Work.* Alfred N. Brewer.

No. 244. 1 *Framed Specimen of Penmanship.* F. W. Williams.

No. 255. 3 *Specimens of Bank Notes.* Casselear, Durand & Co. The execution of these notes were in the well known good style of the engravers.

No. 257. 1 *Design of the Chapel of the N. Y. University,* 1 *do. of City Hall, Brooklyn.* A. J. Davis. These designs were in the best style of the artist, so well known as an architect in this city. The tone of shading and truth of perspective, were particularly admirable. The Silver Medal of the Institute.

No. 275. 2 *Shell Card Racks.* Miss Shipman. For exhibition.

No. 281. *A Basket and Box of Grecian Ornamental Glass.* Miss Minor. Thought by the Committee to be very neat, and creditable to the lady's taste and skill.

No. 283. 6 *Looking Glasses.* Ed. S. Hill, 130 Chatham street. The Glasses were excellent.

No. 288. 1 *Map and* 3 *Engravings.* Wm. J. Mullen, 175 Broadway. For exhibition.

No. 164. *Architectural Drawings.* John Mitchell. For exhibition.

No. 199. 2 *Specimens of Penmanship.* J. A. Lee, 18 Pine street. For exhibition.

MISCELLANEOUS.

No. 12. *Specimens of Tool Handles.* By N. Couenhoven. Considered good.

No. 17. *Miniature Ship.* Capt. Bissel, 368 Broadway, New-York City. A good model.

No. 18. 31 *Specimens of Pottery from the Salamander Works.* Deposited by M. Lefoulon, 62 Cannon street, New-York City. These are beautiful specimens, and the Committee feel justified in saying that they have seen nothing to equal them in this country. In articles of this kind, where competition is so successfully prosecuted with the foreign article, the special notice of the public is merited by the enterprising manufacturers. The Silver Medal and Diploma of the Institute.

No. 21. *Type Moulds.* Mr. Abbys. Highly finished, and apparently very good. The Diploma of the Institute.

No. 30. 1 *Rifle Walking Cane.* A. D. Cushing, Troy, N. Y. Considered a very ingenious and important instrument, and finished in the most workmanlike manner. The Silver Medal of the Institute.

No. 34. *Castor Frames, Lamps, Candlesticks, of Britannia Ware.* I. Weeks & Co. Poughkeepsie, N. Y. Very good and highly finished.

No. 45. *Cork Mattress, Spring do.* and *Cork Bag.* John L. Norwood, 240 Water street. The Committee consider them very good, and worthy of special notice from those who use such articles.

No. 54. 11 *Samples of Snuff.* B. L. & H. Joseph, 138 Front street, New-York City. Diploma of the Institute. The Committee consider the quality of these specimens very superior, and in this they were borne out by the *olfactory* evidence afforded by visitors.

No. 55. *Naval Bombshell—Patent.* Dr. Scudder, New-York City. Cast by Johnson & Geer, Troy, N. Y. and the spikes wrought by Burden & Knower, of Burden's Patent Spikes. This is eminently calculated to effect the destructive purposes for which it was designed.

No. 58. 1 *Beer Pump and Cask.* D. F. Sergent, 40 Fulton street, Brooklyn N. Y. This is a self-supplying Double Power Pump, with little friction, and well suited to the purposes of Bar Rooms, Cisterns, &c. It is also well adapted for the uses of Wine, Cider, or Porter Bottlers, as it will empty casks without disturbing, in the least, the sediments therein.

No. 97. 2 *Printed Table Covers,* and 1 *Piano Cover.* Duncan & Cunningham. Considered of great beauty and firmness of texture. The Diploma of the Institute.

No. 100. 250 *Scripture Gems.* Colton & Jenkins. Considered very well executed.

No. 121. 8 *Specimens of Children's Clothing,* viz. 4 *Suits* and 4 *Tunics.* Mr. Durando, 60 Chatham street. Many of these were considered by the Committee very beautiful, and got up in fine taste. The Diploma of the Institute was awarded.

No. 75. 1 *Fancy Reel, for Winding Silk.* S. H. Platt, 128 Spring street, New-York City. Considered a very useful article.

No. 77. 2 *Boxes of Spermaceti Candles.* Samuel Judd. These were extremely beautiful, and not surpassed by any in the country. The Diploma of the Institute.

No. 78. 1 *Bed Quilt, of* 3,180 *pieces.* Lydia Todden. Considered a beautiful article, and the result of much labor.

No. 128. 1 *Pair Jacks.* 2 *do. Cards.* 1 *Machine Card,* 3 *Shuttles,* 1 *Cleaner,* 3 *Bobbins,* 1 *Side Lace Leather.* John Whittemore, 66 Frankfort street. The Cards and Shuttles were considered by the Committee of superior workmanship, and the *Lace Leather* as possessed of extraordinary merit, and think that it will come into great use.

No. 129. 6 *Pieces Mole Skin Buffalo Cloth.* Peter H. Schenck, 35 Pine street, New-York City. These were thought by the Committee superior articles, and highly meriting public attention. The Diploma of the Institute.

No. 131. 4 *Pieces Carpeting.* G. W. & G. Betts, 434 Pearl street, New-York City. All these specimens were considered good, but that of the Venitian Carpeting was thought to be very heavy, and in pattern and workmanship particularly excellent. The Diploma of the Institute.

No. 155. 3 *Coffee Urns,* 1 *Egg Codler,* 1 *Tea Pot,* 1 *Water Dish and Cover.* James Grant, 315 Broadway, New-York City. These are considered by the Committee of superior workmanship; they therefore award to Mr. Grant the Diploma of the Institute.

No. 161. 1 *Pair Window Blinds.* Francis Baker, 366 Hudson street.

No. 168. 3 *Fishing Rods and* 1 *Reel.* John Conroy. Considered good articles.

No. 175. 1 *Pair Ottomans, Foot Stool, Lamp Mats, &c. &c.* Mrs. Shultz, 45 Lispenard street. Some of these specimens were considered by the Committee extremely beautiful, and highly creditable to the lady who wrought them. The Diploma of the Institute.

No. 181. 4 *Port Folios, or Manifold Writers.* James Gilchrist, 102 Broadway, New-York City. The utility of this contrivance for copying Letters, &c. the

Committee think to be generally known. The Diploma of the Institute.

No. 174. 1 *Brass Trip, or Counter Scale.* W. H. & S. Nichols. Remarkable for its convenience.

No. 115. 3 *Trusses and Case.* Dr. A. G. Hull, 132 Fulton street. The Committee think this instrument admirably adapted for the purposes described; they award the Diploma of the Institute.

No. 186. 3 *Pairs Mantle Lamps,* 2 *Stand do.* and 1 *Astral do.* Samuel Wignall. These were beautiful patterns, and very richly ornamented with cut glass. The Committee awarded the Diploma of the Institute.

No. 198. 1 *Travelling Trunk.* Orlando Williams, 6 Norfolk street. Considered the best specimen offered, and of excellent workmanship. The Diploma of the Institute.

No. 203. 2 *Lamp Stands and Case.* Mrs. Whatmough. These specimens for competition were considered deserving the Diploma of the Institute.

No. 208. 1 *Frame of Castings.* Jones Kiem & Co. The Committee thought these very good, and meriting the Diploma of the Institute.

No. 229. 1 *Patent Coffee Roaster.* G. H. Clark, 4 Fletcher street. This was thought to be very convenient and durable, wherefore the Committee awarded the Diploma of the Institute.

No. 234. 1 *Cherry Stone, containing* 24 *dozen Silver Tea Spoons.* Charles Smith. This exhibited great skill and ingenuity.

No. 264. 1 *Speaking Trumpet.* Colin Lightbody. Considered very well made, and entitled to the Institute's Diploma.

No. 266. *Apparatus for Injecting the Veins.* Dr. J. Mauran. This is for injecting liquids into the veins, and is an appendage adapted to a self-injecting apparatus. It consists of a glass bulb with tubes fitted with screws, so as to be attached to Mob's self-injecting instrument, and so constructed as to prevent the possibility of the passage of air into the veins. The Committee think the instrument superior to every other for the purpose, and therefore award to the inventor the Silver Medal of the Institute.

No. 267. *Dahlia Flowers.* William Prince & Sons. The Committee are under special obligations to Mr. Prince for the splendid flowers which he sent to grace the exhibition hall of the Institute.

No. 291. 2 *Specimens of Fire Works.* Reuben Rider. The Committee thought the pieces very good, and they were much admired by the large company of spectators at the closing of the exhibition at Castle Garden, when Mr. R. made a very brilliant display of the pyrotechnic art. He was awarded the Diploma of the Institute.

No. 280. 1 *Fancy Musket.* John Mullen, 187 1-2 Greenwich street, N. Y. The Committee think this made in the neatest and most workmanlike manner. They award the Diploma of the Institute.

No. 285. *Specimens of Sealing Wax.* Lewis & Co. The Committee consider this the best article they have ever seen of the kind, foreign or domestic. The fancy colored wax in this large collection, does credit to the manufacturers, and should, with all the kinds here exhibited, receive the attention of the public. They award the Diploma of the Institute.

No. 72. 1 *Waggon.* Walters, Barre & Co. Brooklyn, N. Y. A fine specimen of workmanship.

No. 105. *Samples of Mustard.* J. Cogswell, 77 Canal street. For exhibition.

No 130. *Model of Patent Metal Roofing.* John Woolley. For exhibition.

No. 170. 1 *Tin Trunk.* L. Lester, 213 Water street, New-York City. This was a new and ingeniously made article, and one which the Committee particularly noticed.

No. 85. *Pen and Ink Drawing,* 1 *Etching,* 1 *Engraving of Ornamental Iron Work, and* 1 *Frame of Cards.* W. M. Thompson, 167 William street, New-York City. For exhibition.

No. 188. 1 *Ship in Case.* Wm. Searle. For exhibition.

No. 218. 1 *Churn.* Justin Ware.

No. 235. 1 *Miniature Rail Road and Clock.* W. S. Jacks. This was an ingenious piece of work, and was in operation during the Fair, to the delight of the visitors. For exhibition.

No. 247. 1 *Bed Quilt.* L. R. Sweetland. For exhibition.

No. 249. 1 *Bottle, with Reel of Silk.* For exhibition.

No. 263. 1 *Glass Hive.* Mr. Kelsey. For exhibition.

No. 270. *Map of the United States.* James McChesney. For exhibition.

No. 278. 1 *Door Weight.* Dr. Davidson. For exhibition.

N. 24. *Sea-Horse Hide.* Remarkable for thickness.

No. 260. 1 *Framed Oil Painting.* D. Avigney, 183 Broadway. This specimen had no inconsiderable merit.

No. 230. 1 *Large Tabular Plate*, and 16 *Lights of Glass.* New-York and Brooklyn Crown Glass Company. This Company was incorporated in 1832; capital $60,000; employs 50 hands, and produces 10,000 feet of Glass weekly; their Factory is in Brooklyn, near the Navy Yard. The quality of this Glass was considered by the Committee most excellent. The *Plate* was of great dimensions, with equal clearness and uniformity in thickness. The Diploma of the Institute.

STOVES.

No. 282. 1 *Summer Cooking Stove.* Charles Vale, Newark, N. J. This was a superior article, and adds to the reputation of Mr. Vale, as a manufacturer of Stoves.

No. 47. Sent for exhibition.

No. 13. 1 *Parlor and* 1 *Cooking Stove.* Sylvester Parker, Troy, N. Y. Beautiful and convenient articles. The Diploma of the Institute.

No. 27. 1 *Cooking Stove.* Seth Lowe & Co. Made by Mr. Town, Salem, Mass.

No. 56. 1 *Cooking Stove — of Sheet Iron.* Charles Vale, Newark, N. J. Considered a most ingenious arrangement for domestic purposes, whilst it is admirably adapted for an economical appropriation of heat. The Silver Medal of the Institute.

No. 101. 1 *Stove.* James Hinds, 200 Canal street, New-York City. The Committee consider this a very handsome article. The Diploma of the Institute.

No. 122. 3 *Coal Cooking Stoves.* Joel Curtiss, 222 Greenwich street. Considered very neat and useful articles. The Diploma of the Institute.

No. 166. 3 *Cooking Stoves*, 1 *Fancy and* 1 *Parlor do.* Jordan L. Mott, 248 Water street. The Committee consider the two last mentioned stoves novel and useful.

No. 185. 2 *Rotary Stoves and Fixtures.* M. N. Stanley & Co. The ingenuity displayed in the structure of these, and their utility, entitle them to the Diploma of the Institute.

No. 139. 2 *Cooking Stoves*, 1 *Globe do.* Doyle & Patterson, 213 Water street. For exhibition.

No. 146. 1 *Coal Cooking Stove*, 1 *do. for Heat.* S. C. Lawrence, 125 Broadway, New-York City. For exhibition.

No. 27. 1 *Cooking Stove.* Seth Lowe & Co. 211 Pearl street. Wm. Town, maker, Salem, Mass.

No. 66. *Doric Fireplace and Minerva Grate.* Wm. Mallory, Agent. The Committee highly approve of these articles, both for their model and workmanship, combining, as they do, great neatness and utility: the Grate is admirably adapted for the burning of anthracite coal. The Committee award the Silver Medal of the Institute.

No. 79. *Spoor's Patent Coal Stove and Scuttle.* J. F. Clarkson, 51 Fulton street, New-York City. Considered very good and very neat. For the Stove the Committee award the Diploma of the Institute.

APPRENTICES' WORK.

No. 4. *Two Mantle Lamps.* Made by James McGovern, New-York City, an apprentice one year. Considered very good. Privileges of the Institute.

No. 5. *Two Astral Lamps.* William Moore. Considered very good.

No. 11. 2 *Pictures.* George Heister, aged 15.

No. 14. 1 *Cask.* George Thompson, aged 18 years—1 year an apprentice—55 Goerck street, New-York City. Deserving great praise. Silver Medal and Privileges of the Institute.

No. 28. 1 *Iron-bound Cask.* James Flinn, an apprentice, 19 years old, 3 years at trade. Diploma and Privileges of the Institute.

No. 39. *Frame of Cards.* By James Everdell, 135 William street, N. Y. C., a boy aged 15 years. The Silver Medal and the Privileges of the Institute.

No. 50. 1 *Iron-bound Barrel.* James Thomas, an apprentice; 2 years at trade. Privileges of the Institute.

No. 51½. *Gentlemen's French Boot Lasts.* Those in Box No. 3 were made by a boy 14 years old, to whom the Committee award the Privileges of the Institute.

No. 85. 1 *Case of Jewelry.* George

Street, an apprentice, 18 years of age, 3½ at trade. The Diploma and Privileges of the Institute.

No. 90. 1 *Case of Surgical Instruments*. James Turkington, 51 Clinton street; an apprentice, 18 years old. The Silver Medal, and the Privileges of the Institute. The Committee are of the opinion that the case of Surgical Instruments, here presented, exhibits talents and zeal in the maker worthy of being stimulated to further exertions, and that these specimens of his workmanship are of surpassing elegance and finish.

No. 136. 1 *Silk Hat*. James Patterson, 94 Canal street—1 year an apprentice with Mr. John Wright. Considered, from the short experience of the maker, an uncommon evidence of skill.

No. 137. 1 *Clock Stand, and* 1 *Marble Ink do.* Wm. Patterson, 33 Canal street, 3½ years an apprentice to Mr. Barnes. Considered excellent work. The Privileges of the Institute.

No. 150. 1 *Leather Travelling Trunk*. Geo. Dupignac, 28 Hester street, nine months an apprentice to O. Williams. The Committee take pleasure in noticing the early efforts of apprentices, and this specimen is one among those to which their attention has been called. The Privileges of the Institute.

No. 73. 2 *Tables*. Joseph Fisher, 15 years old; an apprentice 1¾ years. The Diploma and Privileges of the Institute. These specimens certainly gave great promise of talent in the young mechanic, and were duly appreciated by the Committee.

No. 155. To Wm. Taylor, an apprentice, 19 years of age, manufacturer of a *Coffee Urn*, the Committee award the Privileges of the Institute.

No. 240. 3 *Carpenter's Ploughs, and* 7 *Spare Irons*. Isaac Battie, Providence, R. I., 18 years old, apprentice 3 years to J. R. Gale. The superiority of workmanship displayed by this young man, in the make of these articles, entitles him, in the opinion of the Committee, to the Silver Medal of the Institute.

No. 53. 5 *Ladies' Straight Lasts*. R. Coit, a lad 16 years of age; 1 year at the trade. The Privileges of the Institute.

No. 87. 1 *Carved Ionic Cap*. Samuel Smith, aged 16 years. Well executed.

No. 152. 1 *Engraving of McDonald Clarke*. Lewis P. Clover, aged 16, first attempt, 6 months at trade. Considered an evidence of uncommon merit in his business, and therefore worthy of the Diploma and Privileges of the Institute.

No. 84. *Machine for Corking Bottles*, made by Augustus Williams, an apprentice, deposited by F. Groening. Privileges of the Institute were awarded to the apprentice for the workmanship, which was excellent.

No. 91½. 3 *Pairs Pocket Compasses*. By Gerrett Barney, 16 years of age. Apprentice to Brown & Hunt. These have much merit. A Diploma, together with the Privileges of the Institute, have been awarded to the apprentice.

During the evening which closed the Fair of the Institute, Dr. Gale made several brilliant and interesting experiments, with the Institute's powerful Galvanic Battery. The combustion of Charcoal, and Platinum, displayed an intensity of action, power of heat, and vividness of light, which astonished the numerous auditors. The light was altogether too dazzling for the sight, and could be viewed only a few moments at a time. The combustion of metals in water was not the least interesting to the ladies and gentlemen present, who repeatedly manifested their surprise and gratification, during the performances, by loud and cheering applause.

The novel exhibition of *Walking upon the Water* was also presented from the Garden to thousands of our citizens during the Fair of the Institute. Mr. Macintosh, the successful experimenter, entered the water near the Battery, and walked a considerable time in the North River, sustaining himself in an upright position, and moving with much apparent ease, though the surface of the water was agitated by rough and high waves. This experiment satisfactorily proves the importance of the simple apparatus used on the occasion, for fording rivers, and for preservation against accident.

Committee on Premiums.

George Bruce,
Henry Cunningham,
William Partridge,
Henry Durell,
John M. Dodd,
Adam Hall,
John Bell,
W. H. Hale,
J. S. Redfield.

FAIR OF THE AMERICAN INSTITUTE.

This splendid display of that spirit which is constantly urging our yet infant nation still onward in the march, or rather flight of improvement, has now closed; and it is not enough for us merely to say, it has not only exceeded the most sanguine anticipation of the most enthusiastic American patriot, but it has surpassed any thing which could have been believed, had it been predicted. The official Report is in detail before the public; but we deem it not only a privilege, to which we are entitled, but a duty we owe to our readers to present them, in our own way, our own opinions, comments and remarks, if not on every article, at least on some of those we considered most particularly worthy of notice.

In estimating the respective value of the productions of human ingenuity and industry, we should place in the first rank, and at great distance before any others, those which increase the *productiveness* of human labor. He who, by his ingenuity, can contrive, in any branch of labor, in which ten thousand people are employed at one dollar per day, to produce the same effect by the labor of one thousand, or ten times the effect produced before, by the ten thousand; if he does not deserve all the increase his ingenuity has produced, he certainly deserves, and well deserves, an immense pecuniary reward, together with the grateful thanks and the cheering applauses of mankind. But it is painfully true that exactly the reverse is generally the case. The authors of far the greater number of labor-saving inventions have met no reward but poverty and contempt.

The next in order of merit is he who, by his ambition to excel, produces the fairest and most improved specimen, or the greatest quantity, of any article contributing to the comforts, or the innnocent pleasures, of life. The agriculturist, who can exhibit the most improved article in his line, either animal or vegetable; or the manufacturer, who produces the most valuable sample of cloth, or any other manufactured article, ought, certainly, to be rewarded and respected accordingly; but no person of sense will contend that the man who produces the largest and fattest ox or swine, or the finest and best article of clothing, can rank, in the scale of merit, with him who has contrived means to make the same labor, in produing these articles, yield ten or a hundred-fold.

The next degree of merit, we consider, (though our judgment may by some be called in question,) belongs to the persons whose genius and refined taste serves to increase and improve the embellishments of life.

With these remarks, we shall give our notices of the various exhibitions at the Fair accordingly.

LABOR-SAVING INVENTIONS, AND IMPROVEMENTS IN MANUFACTURES.

Shaw's Patent Threshing Machine and Horse Power.—Presented by T. L. Pollard & Co., Albany. There is probably no other branch of labor which has been the subject of so many patented inventions as Threshing; and there are so many constructed on the same leading principles, that it would be impossible to tell with any certainty, which is entitled to preference, or for the patentees of a dozen or twenty, to point out how their respective Machines differ from all the rest. But it is a fortunate circumstance, that those of late invention are nearly or quite all good. Mr. Shaw's is among the number, and for aught we can see, as good as any. The Horse Power seems to present the greatest difficulty, and in this, we think Mr. Shaw's as good, and perhaps better, than any others; as it will operate with as much certainty, with as little power, and at less expense, and being less complicated, is less liable to disorder; and we are not afraid, therefore, to recommend it to any farmer.

Fitzgerald's Grinder, and Threshing Machine.—This Grinder consists of the frustrum of a cone, of French burr, which runs on a horizontal axis in a conical hollow case of the same material, which is in two halves, the one stationary and the other moveable. We saw it in operation by a single horse power, and it made flour of the first quality, and we should say half as fast as a common grist mill,

with a full head of water. It must need be an excellent article where large grinding establishments cannot conveniently be come at, and for many uses where they can.

The Threshing Machine is a good one, but we shall make no comparisons in that article.

Walter Hunt's Patent Forest Saw.—We cannot better describe this article than in the inventor's own words. "A simple, effective Machine, designed for felling trees and cross-cutting their trunks for lumber; and also, for the purpose of clearing wild lands." We consider this an article of peculiar value for the following reasons: First, we are confident trees may be felled with it as fast, and we think faster than with the axe. Second, It may easily be carried and used by one man,—its weight being only 30 lbs. Third, It will cut nearer the ground than can conveniently be cut with an axe, and of course leave the stumps lower. Fourth, By felling trees with the axe, the trunks are often split near the ground, and valuable timber spoiled, which will not be the case in sawing. Fifth, Its cheapness puts it within the reach of every man engaged in lumber.

Throstle and Speeder, for Roving and Spinning Cotton. — Made at the Oldham Works, one mile from Paterson, N. J., under the direction of B. Brundred, and exhibited by Samuel G. Wheeler & Co., 42 Pine street, New-York.

These Machines exhibit some improvements in the principles of their construction; but the points which most strongly recommend them, are excellency of workmanship and materials, in both of which they are truly elegant, without superfluity; and we do not believe they can be surpassed in correctness of operation.

Washing Machine.—Invented by A. W. Soule, and *another*, by William Niffin.

We have seen many patent Washing Machines, and each declared by the inventor or vender, to be far superior to any other. We will venture to say, that the two above mentioned are both good, and probably that they are equal to any we have seen.

Improved Drill,—made by D. B. King, of Waterford. The importance of a discovery is in no direct proportion to the magnitude of the object discovered. This little diamond is worth a whole quarry of granite, though the latter is valuable; and in such proportion we consider the value of this little invention of the Drill. Every good Mechanic will feel the same pleasure, when it meets his eye, that a skillful connoisseur in the article would feel on finding a valuable diamond.

Machine for Making Staves, — invented by Philip Cornell, of New-York. As a *hand labor saving* invention, we have some doubt whether this Machine has any superior; and it does its work in a style which hand labor cannot imitate, without an immense sacrifice of time. It not only finishes, ready to put together, of any suitable timber, from 200 to 400 Staves per hour, and which need no dressing off, after they are set up, but it effects a vast saving of timber, as one Stave is taken in its finished state, directly from the side of another, without any intermediate waste.

Machine for Cutting Lath. — We can truly say of this Machine, that for operativeness, simplicity, and cheapness, it can hardly be surpassed. It cuts from 60 to 80 Lath per minute, and as they are cut off smooth at one stroke with a sharp tool, their quality is improved, and there is no waste, even of a saw-calf.

Improved Clock, — made by George Gaines, at Seneca Falls, and exhibited by E. W. Adams, the Proprietor. We had neither time nor opportunity to examine in detail the improvements in this beautiful specimen of Clock work. But we saw enough to convince us, that its plan is superior to any other now in use, as an accurate time keeper, either for private houses, or for churches and other public buildings, and we hope and trust that both the inventor and the proprietor will meet liberal encouragement from the public, which we think they certainly merit.

Improved Theodolite,—made by Ewin & Keartte, Baltimore. Invented and exhibited by Samuel Stone. We cannot do justice to this splendid invention, as well as elegant specimen of workmanship, in the brief cata-

logue we are giving, so well in any other way, as to let the inventor speak for himself—we therefore give his own words.

"This Instrument embraces all the principles of a Modern Theodolite: besides which, it contains the following improvements—The first improvement is a circular revolving plate, sliding or resting upon the limb of the instrument. The upper surface of which forms a plane with the upper surface of the limb; on which are delineated a set of Mathematical numbers, which supply the place of a Table of Logarithms, and all other logarithmic tables.

"In the second place, this Instrument is so constructed as to supersede the necessity and use of a Chain in all cases. The distance of any visible object can be ascertained at one station, as far as a flag staff can be distinctly seen through the Telescope of the Instrument, to the exactness of chains, links, and decimals.

"It also calculates the Latitude and departure of every course run, and the base and perpendicular of all elevations. It further embraces all the fundamental rules of common Arithmetic, viz: Multiplication, Division, Single Rule of Three, Interest, Mensuration of Superfices and Solids, Gauging, &c. Any question in plain Trigonometry, right angled or oblique, can be solved on the Instrument correctly; including all questions that can be performed by Logarithms or Logarithmic Tables. The whole without the use of figures or a mathematical calculation."

Cheese Press, invented by S. Kibbe. This is the best plan of a Cheese Press we have ever seen.

Mowing and Grain cutting Machine, invented and exhibited by Capt. Alexander Wilson.

In estimating the value of this labor-saving Machine, it is necessary to consider the quantity and quality of the labor saved by it. It is well known that cutting down grass and the different kinds of grain, is far the hardest and most extensive, as well as expensive branch of labor in the whole catalogue of farming operations; and that it has to be performed at the critical moment when in season; and the farmer is often, thereby placed at the mercy of his hired laborers, who always charge a higher price for it than for other labor, and at times take undue advantage of the employer's necessity.

Now, if this Machine answers the intended purpose, and we can see no reason why it should not, the farmer, instead of complaining, that though the "*harvest is plenteous, the laborers are few,*" can dismiss eleven of his twelve laborers; saving not only all their wages and food, but all the liquor they drink; or, if he feel a charitable disposition to employ the poor, he can by the money so saved, extend his fields to ten or twelve times their present size, and increase his stock, and consequently his wealth, accordingly. Capt. W. calculates that this Machine, with a man and horse, will do the work of twelve men in cutting either grass or grain. His plan appears to be simple and well digested; and if it should be susceptible of improvements, as he is himself a farmer, there can be no doubt that the head which has conceived the plan thus far, will be able, by the light of experience, to perfect what appears, at least to us, to be so ingeniously begun.

Machine for Sawing and Jointing Shingles, invented by David B. Moore.

We have seen several Machines for sawing and jointing shingles not very dissimilar, possibly the same. We think, however, this has some improvements; at any rate, this is a good Machine. The exhibitor states that it will make 10,000 shingles per day with a 5 horse power, which is probably the case. It would, therefore, in a place where there is plenty of timber, and a sufficient water power, be a valuable and profitable article. The cost is $100.

Double-Acting Bellows, invented by Chs. D. Holmes.

This will be a valuable article, where a continuous and steady blast is wanted, either on a large or small scale. It occupies but little space, is not expensive, and cannot fail to effect *the purpose.*

Locomotive Chair, for people incapable of walking. By James Grey, Brooklyn.

This is a valuable invention for persons unfortunately deprived of the power of

walking. It is a handsome mahogany chair of compact size, and the machinery by which the person moves it with either hand, is not only simplified to its lowest terms, but is truly ornamented. Mr. G. is, as far as we know, the first who constructed such a chair, and his improvements are the result of 15 years' experience.

Double-acting or Continuous Pump, for the use of houses, stables, &c. By Dudley L. Farnham.

This article is not new, though the patent has not yet expired: we have known it some years, and still know it as an excellent article.

Patent Churn. By Francis Lane.

This was the most simple looking article exhibited at the Fair; and yet we presume not only every lover of good butter, but every one who recollected as we well recollect, the many and painful hours spent in boyhood at the tedious labors of the Churn, when ever and anon, the relaxed sinews of industry received new stimulus from the cheering (not to mention fretting) admonitions of the good mother, prompting us to perseverance, and who saw this Churn, must have felt, as we felt, a peculiar glow of satisfaction as he passed it. We have seen patent churning machines tortured into every earthly shape except that of a real Churn, and adapted to all sorts of purposes but churning; but this was none of them. It was no machine at all, nothing but a couple of the real old churns of the days of our childhood, and each making the other go of itself, without the application of any power which would tire a child.

Patent Roastmeat Jack, made by Edward Shepherd, Paris, Oneida county.

This is a very ingenious and simple contrivance to turn, by clock work, a spit for roasting meat. When cooking is done on a large scale, we should consider it a very valuable article.

Improved Shears, made by David Ward.

These Shears, which were exhibited in a case with a lot of the most elegantly finished Shears we have seen, were on a plan which we should think a very great improvement, where several thickness of cloth are to be cut through at once. By a combination of levers, so light and so ingeniously contrived as to be no more unwieldy to the hand than common shears, a power is gained sufficient to cut through forty thickness of cloth without straining the hand.

Morticing Machine, invented and exhibited by George Page, of Keene, N. H.

This is one of that family of inventions which seem actually combining together to turn labor into sport, and at the same time, to increase its productiveness as if by magic. It has been exhibited in operation most of the week, morticing table legs, bedstead posts and other articles—made 16 mortices in a minute—makes them straight or circular, or oblique to any angle; will mortice a 14 spoke hub in 5 minutes, and all with more accuracy and neatness than those made by hand.

The price of the Machine, with a set of 6 chisels, is $30. He has also a machine for making mortices in framing a building, with nearly the same despatch. We should think no man, whose business embraces making mortices in wood, would be long without one.

Another *Morticing Machine*, by Richardson and Dennis, is doubtless a good article, but we did not see it in operation. But a little the most marvellous specimen of labor saving, or rather labor annihilating, we saw, was a brace of

Machines for making Biscuit, made and exhibited by J. & C. Bruce.

One of these Machines is for large and the other for small biscuit. The small one is calculated to mould in the most perfect manner, and to bake and complete at the same time 48 in a second, or 2880 in a minute, or to go a step farther into the marvellous, 162,800 in an hour. Or, to tell the whole story in few words, he will, in one hour, convert about 18 barrels of flour into good and wholesome bread. The baking part of this Apparatus was not exhibited at the Fair. We are, therefore, not authorized to vouch for the report of this part of the invention. Of the rate of moulding we had occular demonstration. The inventor as-

sured us that his plan comprehended the baking as well as the moulding, and that he had it perfectly matured, though it was not exhibited.

To pass over all other considerations on the Bread-Making Apparatus, we should think its importance at sea, and in war, enough to enrich, if not immortalize its inventor. A given quantity of flour takes up less room in storage than the same baked into bread. In long voyages at sea, instead of barely preserving the spark of vitality, by gnawing upon a dry and mouldy substance, which, perhaps, was once bread, but is now the habitation of myriads of noisome insects, the health of a crew will no doubt be promoted, independently of the comfort, by good and wholesome bread every day, or at farthest once a week; and the same benefits will result to an army on land.

The whole expense of this wonderful Apparatus, sufficient for a ship of the line, will not exceed $100, and the space it will occupy is so small as to be of no consequence. Who can tell why this does not meet with encouragement?

Arnold's Patent Machine for Making Twisted Roving.—The several inventions for making Rubbed Roving, and the preference given to that kind of Roving, except for fine twist, have nearly superceded the use of Twisted Roving altogether in this country. But in spinning cotton from 60 hanks to the pound upwards, Roving is doubtless to be preferred with some twist; and as we are constantly progressing towards finer fabrics, we think this speeder may become a valuable article. Such is the opinion we formed, in the absence of any one to explain it.

Hamilton's Machine for Sawing down Trees.—This article stood in the Fair by the side of, and of course in competition with, that of Hunt, and we noticed the preference alternately given to each, by the multitude who examined them. But these opinions weighed nothing with us. We assume the right to judge for ourselves. There were some strong points, respectively, in favor of each. Cheapness and portableness were in favor of Mr. Hunt's Machine. The effect of the fly wheel, to equalize the resistance to the power applied, was in favor of Mr. Hamilton's. The former is the application by hand, aided by a lever, and spring of the saw, directly to the tree. In the latter the saw hangs upon a frame, swinging upon a pivot, operated upon by a crank and fly-wheel, and pressed forward to its work by a weight. We shall appeal to the decision of time and experience, for a decision as to their relative value.

Blowing Machine.—This is an ingenious contrivance, by Mr. Brundred, of the Oldham Works, near Paterson. It consists of the frustrum of a cone surrounded with spiral fans, which being inclosed in a conical shaped case, the air is converged and forced out at the small end with any force, according to the propelling power. It will prove a useful thing.

Model of a Spiral Reacting, or Tub Water Wheel. This is one of a numerous family of Water Wheels, varying but little from each other, and which we think is as good as any we have seen of the kind. They are importantly useful in certain situations.

Improved Stoves.—This is a very important subject, and worthy to engage, as it has engaged, the most eager emulation. But the competitors are so numerous, and so many important improvements have been exhibited, that it would be difficult if not impossible to award the victory with justice to any one. At this Fair there were 80 different stoves exhibited. The preference in this department of invention has been generally given, and we believe justly, to Dr. Nott. But it seems impossible for one man to run so fast in any race but that another may equal him. We had not an opportunity to examine critically the merits of each stove, but we think the claims of Mr. James Wilson, of Mr. Parmalee, and of Mr. Parker, entitle them to a candid examination.

Bee Hives.—Among the numerous useful improvements, we saw none more entitled to patronage than the bee hives, exhibited by Messrs. Parish and Kelsey. Both their plans were good. We were instructed and amused by the practical knowledge of Mr. Kelsey on the subject, a degree of knowledge which few men would have patience to

acquire; we intend to profit by Mr. K's instructions, but we prefer the hive exhibited by Mr. Parish. We hope the labor and examples set by these gentlemen, will put an end to the shameful pratice of destroying these industrious little creatures with fire and brimstone.

Printing Press.—The hand Printing Press of M. L. Kingsley, embraces some improvements in simplicity and facility of working; and notwithstanding the overwhelming importance of the double or single Napier Press, we think this still has its usefulness, and is entitled to respectful notice.

MANUFACTURES.

As it is proper to commence with the most valuable articles, we will select *Mr. Pemberton's Improvement in Gold.* Mr. P. has succeeded in effecting a perfect and solid union between pure gold and pure copper, and between 18 carat gold and a composition very suitable for various purposes, in so perfect a manner that a bar plated and drawn down will answer an infinite number of purposes, in all respects as well as solid gold. The Buttons exhibited by Mr. P. manufactured in this way, are in all respects, for use and beauty, superior to buttons of real gold, as the metal on which they are plated is more substantial, and all that can be seen is gold. The same, when plated on both sides, may be said of the Watch Cases—and we might add, many other articles.

Silver Ware.—The specimens of Silver Ware exhibited by Mr. Marquand, 181 Broadway, and Mr. James Thompson, 129 William-st., produced the most agreeable astonishment, especially to us, who well remember when to produce a common Silver Buckle in this country, was a thing viewed with utter astonishment.

Articles of Copper.—We saw several elegant aritcles of Copper, which we thought quite as worthy of attention, and as useful as those of gold or silver, though the material did not cost so much.

We will next notice some articles chiefly of Steel and Iron, which we consider to be of still more intrinsic value than those made of any other metal.

We will begin with the beautiful specimens of *Edge Tools*—consisting of Chissels, Gouges, Drawing Knives, Broad Axes, &c. &c. Superior in finish to any imported ones we have seen, and we trust no less so in temper, as they were manufactured by Kennedy & Way, of Hartford—in the senior member of which firm we recognize an old friend, whose ingenuity, in that line, as well as honesty and patriotism, we have witnessed in days of "*Lang Syne.*"

The *Wood Screws*, by Messrs. J. G. Pierson and Brothers, are far superior to any imported articles of the kind we have seen.

The Case of elegantly finished *Shears*, of somewhat varied descriptions, but above all the pair with increased power which we have already described, are elegant indeed.

Another valuable item was *Hinges*, of various descriptions—a most superb artiele.

Door Locks—and various other articles composed of metal, all of which were superior to any thing of a similar nature which we have been accustomed to meet with.

Watch Dials, of rich and superior beauty, by Mr. Mullen, 175 Broadway.

Sheet Brass, manufactured at Waterbury, Connecticut—a very important article, and of excellent quality.

Sheet Zink, in very large sheets.

Razors, Penknives, Shears, and other Cutlery, in as high perfection as ever graced a show-case, by Robert Ward, 142 Fulton-st.

Another sample, of similar character, by William Wild, 142 Fulton and 162 Division street.

Augers, and various instruments for boring, of the most improved form, and exquisite workmanship.

A splendid lot of Joiner's and Cabinet Maker's Tools, such as an ambitious young man might feel proud to work with, and such as twenty years ago were never seen on this side of the Atlantic, and perhaps rarely on the other, by A. & E. Baldwin 404 Broome street.

Scales and Scale-beams, of the most approved forms and finished workmanship, by D. H. & S. Nichols.

In the line of *Clothing*, we can only say collectively—there was a universal assortment composed of every material, except

Silks, which we have every reason to believe will form a brilliant climax to the display another year. The exhibition of *Broadcloth, Cassimers, and other Woollen Goods*, left apparently but little room for future improvement. One piece of *Black Cloth* in particular, without any disparagement, to the rest, was for excellency of finish, and particularly for its silky softness, a proud article for our country, or any other. It was made by C. A. Beecher, Waterbury, Connecticutt.

In *Cotton Goods*, the display was highly respectable, consisting not only of almost every article of undyed Cotton in use, but of dyed and printed Goods, of exquisite beauty. The printed Muslins and dress, and furniture Calico, from W. Robertson, of Fall River, did credit to the Manufacturer, and to the country.

The *Cut Glass*, from W. T. Morton, of Baltimore, was as near perfection as our fancy can reach.

The specimens of *Bookbinding and Blank Ruling*, were beautitul indeed—if they can be surpassed it would be needless.

The various articles of *Cabinet Furniture*, some displaying superior workmanship—some improved form, and ingenious contrivances for convenience, and some both, were well worth their price, to those who can afford to buy them, and a gratifying treat to us who could not.

With respect to the *Piano Fortes*, and other stringed as well as wind Instruments, we can only say, in general terms—they were a superb display, but we were not surprised nor astonished, for we expected to find them so. It is to be feared they have left no room for improvement another year.

We must not forget, as a specimen of American manufacture, a *Bolt of Duck*, a most substantial and well finished article, by our valued friends Amos Briggs & Co. Scaghticoke.

Various articles of *Indian Rubber* were exhibited, which were not only valuable in themselves, but much more peculiarly so, as they pointed to an immense, but yet unexplored field of future improvements, of which that article is to form the foundation. The little net-covered globes, or parlor balls, exhibited by H. Percival & Co. must certainly furnish an all-important hint to the Æronaut. But at any rate, we have no fear in predicting that the hundredth part of the uses of this long neglected article have not yet been thought of.

The specimens of *Crown Window Glass*, from Redford, and from Brooklyn, certainly bid defiance to any other country in that line. As they stood in a bad light, we could not decide which was entitled to the preference, if either; but either of them far surpassed any imported Crown Glass we ever saw.

There were some beautiful specimens of *Swords*, but as we profess to belong to the *peace party*, we hope they will never come into general use.

Relief Bed for the Use of the Sick.—Among the numerous and successful displays of inventive genius, we saw nothing which merited more grateful applause, or a more liberal reward, than the above article, invented by Mr. Jones, of Providence. R. I.

Mr. J. states that he has been employed a great number of years in attending on the sick, and that the plan he has presented has been suggested by necessity, and improved and directed by his long experience, and it may be truly said his services confirm his statement, and do credit to his genius.

By this wonderful contrivance, whilst a sick person may be lying horizontally and asleep on it, the upper part of the bed may be elevated to any angle required, and, if necessary, lowered again to the same position—or the patient may be raised from the bed altogether, and swung off by a crane, at the head of the bed, while the bed is made, and then put back on a fresh made bed, and all this without sufficient jar to awaken the patient from the most delicate and watchful sleep.

Whenever the state of the patient requires, or admits of sitting in a chair, the bed may be immediately transported into an easy chair, and back again in a moment, when required, to a bed, in so gentle a manner as not to give pain even to a broken limb. Should the patient be delirious, even to the most raving maniac, this same soft bed is in an instant made to supercede the use of the straight

jacket, by confining the body, head, and even the limbs, in the most perfect stillness, and without the slightest pain; and in addition to all these conveniences, the necessary calls of nature may all be attended to with the most perfect cleanliness, and without the slightest movement of the patient.

Who would not be willing to reward so much ingenuity applied to such a purpose?

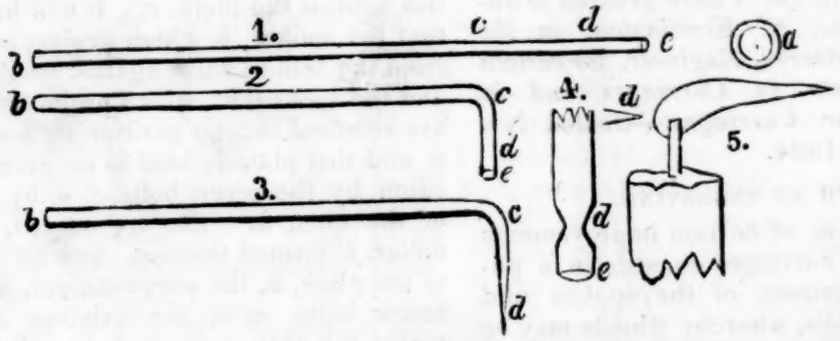
We have now enumerated, with occasional remarks, those articles which we thought most important; especially the most useful. To go into an entire detailed description of the several hundreds of fancy and minor articles, though many of them were useful, and all perhaps displayed ingenuity, and a spirit of enterprise which deserves encouragement, yet we think it would occupy too great a portion of our pages, which our readers would decide might be appropriated to better use.

We shall notice, when we have leisure, and room in our pages, some of the foregoing articles, more at length, and give engravings in cases where we can obtain them.

[From the London Mechanics' Magazine.]

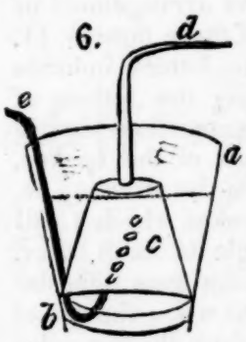
ON THE PRACTICE OF THE BLOW PIPE.—The introduction of the use of the blow pipe in practical chemistry, may be regarded almost in the same light as the application of the power of steam to the purposes of commerce. If the latter has increased our national resources, and forwarded the interests of mechanical science, by economising the labor and expenditure which were formerly bestowed, the former has, in like manner, advanced the cause of chemistry, and its dependent sciences, by reducing the expense of fuel, time, and material, which were originally required in qualitative analysis. If the mechanic can now produce, with comparative ease and expenditure, an article which, before the introduction of the steam engine, would have required the labor of many weary days, and the consumption of much valuable material,—the modern chemist can, with equal facility, detect the constituent principles of a body, which, before the invention of the blow pipe, would have called in requisition the unremitting exertions of many tedious nights, and the profuse employment of many rare, and, perhaps, valuable substances. In fact, by the introduction of this simple, yet invaluable instrument, the modern chemist can, by his parlour fireside, and with a common candle, perform those operations, to accomplish which, the ancient and less gifted philosopher would have been compelled to resort to the unhealthy atmosphere of a laboratory, and the continued poring over an intensely active fire. The blow pipe, according to Bergman, had been long employed in the arts by jewellers and others, for the purpose of soldering, before it was applied to the purposes of analytical chemistry and mineralogy, by a Swedish metallurgist, of the name of Sual, about the year 1733. This individual, however, appears to have left no written account of the method which he adopted in the application of this instrument. The researches of Cronstedt, Bergman, and Gahn, and, more recently, those of Berzelius and Faraday, have concurred in raising this instrument to the eminent station of utility which it at present enjoys. In the work of Berzelius on this subject, will be found ample instructions for the pursuit of mineralogical and analytical chemistry; and in the "Chemical Manipulations" of Dr. Faraday, the student will meet with copious directions for applying this instrument in the bending and blowing of glass, in practical chemistry. For the former purpose, the mouth blow pipe possesses undeniable advantages; but for the more fatiguing operations of the latter, the table, or hydrostatic, blow pipe will be found convenient. The advantages possessed by the mouth blow pipe over all those instruments whose blast is produced by artificial means, consists in its portability, economy, and the facility of immediately suspending or modifying the blast. "The chemist does not possess," says Dr. Faraday, "a more ready, powerful, and generally useful instrument, than the mouth blow pipe, and every student should early accustom himself to its effectual use and application."

The supply of a *continued* stream of air, is the chief difficulty which a beginner experiences in learning the use of this instrument, and this difficulty is, I apprehend, not unfrequently increased by the employment of a blow pipe with too large an orifice, in the first instance. The



following method of constructing, will, I have reason to believe, be found more efficacious than any other hitherto published, since I have, by its means, succeeded, in less than half an hour, in communicating the art of blowing to a class of several persons. Let the pupil procure a tube of glass, *b e*, about thirteen inches long, and of the size and thickness of *a*. Let him now thoroughly heat the tube at *c*, about two inches from the end, by slowly turning it round in the flame of a candle, or, what is better, a spirit lamp. When he finds that it will yield, let him bend it gradually till it has acquired the position represented by fig. 2. The part *d* is now to be heated in the same manner, till it is found soft enough to draw out, when the part *e* must be gradually withdrawn, as represented in fig. 4, till it terminates in a point; this point should be held for a minute or two in the point of the flame, in order to thicken it, and when cold it is to be ground away with a file, until the smallest possible orifice is visible. The pupil will now be possessed of a blow pipe (fig. 3,) with an exceedingly minute jet; and if he puff out his cheeks to the utmost, and place the end *b* within his lips, while the other extremity is held within a short distance of a candle, (fig. 5,) he will, after a few trials, find no difficulty in keeping the flame *continually*, and *without intermission*, horizontal and clear. The operation which he will be required to perform, in order to keep his cheeks constantly distended, notwithstanding the escape from the jet, cannot easily be described, but will naturally offer itself when the expenditure of air is very small. When the pupil has succeeded in keeping up a constant blast for several minutes, by this means, he may enlarge the aperture by degrees, practising between each enlargement, till he finds he can manage a blow pipe with a large bore, when he should purchase one of brass, with an ivory or tinned mouth piece, for general use.

Among the numerous hydrostatic blow pipes which have already appeared in your Magazine, the pupil who wishes to manufacture his own apparatus, may assuredly find one which will form a substitute for the table blow pipe. I subjoin a plan for one, which may be constructed, at a trifling expense, by almost every student, and in situations where the articles of workmanship requisite for the construction of a more complicated machine, could not be procured.



a b (fig. 6,) is a common pail, about half filled with water; *c* is a large flower pot, inserted, and fastened in by any convenient method; *d* is a mouth blow pipe, (glass would do on an emergency,) fastened in air tight, with a cork and lute, to the hole at the bottom of the flower pot; *e* is a bent tube of glass, or metal, terminating under the mouth of the flower pot. When air is blown in from the mouth at *e*, it rises into the body of the internal vessel, and displaces the water, which, in endeavoring to regain its level, forces out the air from the jet of the blow pipe, with a force proportioned to the height of the column of water displaced.

The length of the *paved* streets in England and Wales is 20,000 miles; that of the roads which are not paved is 100,000 miles. The extent of the turnpike roads is about 30,000 miles.

[From the London Repertory of Patent Inventions.]

***Specification of the Patent granted to* Joseph Gibbs, *of Kennington, in the County of Surrey, Engineer, for certain Improvements in Carriages and in Wheels for Carriages.*—Sealed November 4, 1834.**

WITH AN ENGRAVING.

My invention of certain improvements in wheels for carriages consists in a peculiar arrangement of the spokes and naves of wheels, whereby wheels may be constructed with greater facility as will be hereafter fully described.

Description of the Drawing.]

Fig. 1, represents a wheel constructed according to my improvements, which I prefer first to describe.

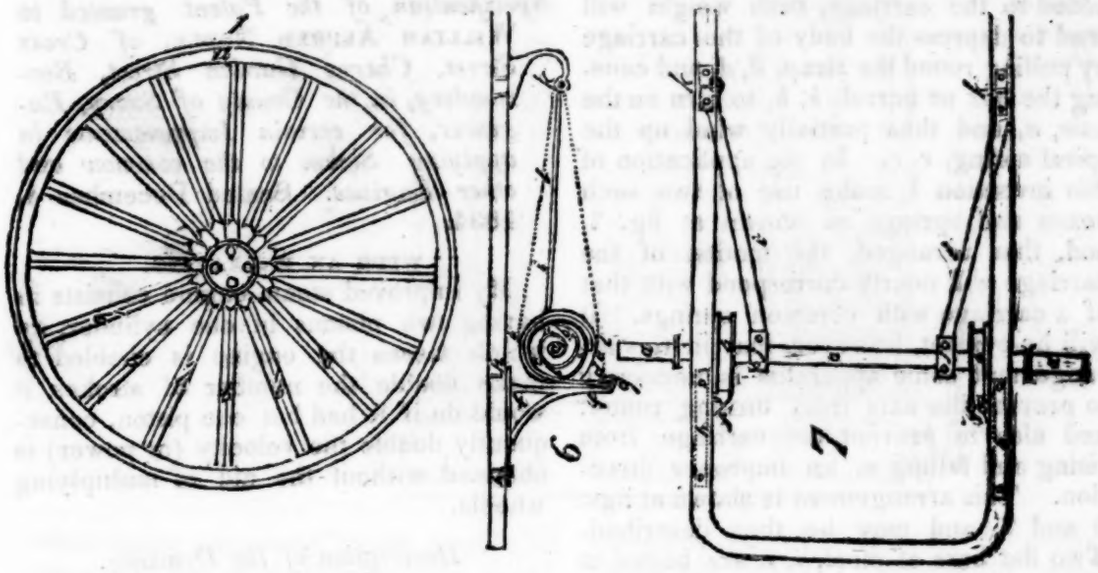
Fig. 2, is an edge view in section.

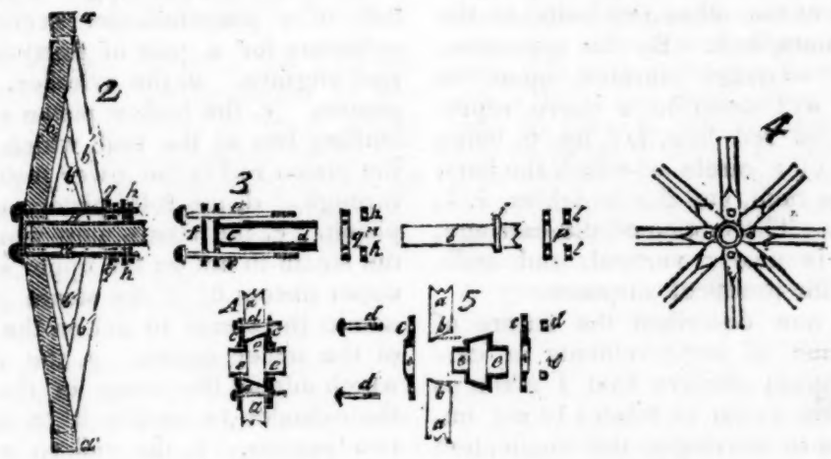
Fig. 3, shows the nave in section, which is of metal. This nave also constitutes the axletree box.

Fig. 4, shows part of a wheel in section in order to shew the arrangement of the spokes. In each of these figures, (1, 2, 3, and 4,) the same letters indicate similar parts, *a*, *a*, being the felloes of the wheel, there being mortices cut in them to receive the ends of the spokes, as is clearly indicated in the drawing at fig. 2. *b*, *b*, are the spokes which it will be seen stand at an angle to each other, and each two (proceeding from opposite ends of the nave) appear when the wheel is viewed edgeways to form the two sides of an isosceles triangle, of which the nave represents the base; but it will be seen that the spokes are inserted at equal distances from each other in the felloes, and they are alternately placed at the two ends of the nave, as is very clearly shown in fig. 2, and the ends of the spokes are slightly hollowed out in order to abut against the axletree box which constitutes the nave of the wheel. *c*, is a plate formed on the outer end of the axletree box, *d*. The spokes may be so formed at the ends which come against the axletree box, *d*, that they just fill in and wedge one another, as shown in fig. 4, or there may be longitudinal grooves cut or cast on the outer surface of the nave or axletree box. *e*, *e*, are screw bolts which retain the parts of the wheel together, and also hold the axletree within the axletree box, as will be hereafter fully described. *f*, is a washer which lies against the plate, *c*. It will be seen that the spokes, *b*, which project outward from the felloes come against the plate, *c*, and the spokes, b^1, which project inwards are retained in their position by the plate, *g*, and this plate is held to its proper position by the screw bolts, *e*, *e*, by means of the nuts, *h*. The axletree, *i*, has a collar, *j*, formed thereon, and by means of the plate, *k*, the screw nuts, *l*, and the screw bolts, *e*, *e*, the axletree is held within the axletree box, *d*, as will be evident on inspecting the various figures in the drawing.

Having thus described the various parts of the wheel, when constructed according to my invention, it is necessary to point out more particularly the pecular novelty of the construction which constitutes the invention secured by the above recited letters patent. It will be evident, that as any two succeeding spokes, b, b^1, may be said to form the two sides of an isosceles triangle, the axletree box or nave, *d*, forming the base of such triangle, if the plate, *g*, be made to approach the plate, *c*, the spokes, b^1, will approach the spokes, *b*, that is to say, they will approach more nearly to the perpendicular, which will tend to expand the circumference of the felloes, and make the whole wheel most rigidly secure, and thus in case of the spokes becoming loose, the wheel may be made firm by merely screwing up the plate, *g*: and it may be remarked, that a wheel constructed according to these improvements, may be repaired in much less time, and at less expense, than when wheels formed in the ordinary manner, for it will only be necessary to remove the plate, *g*, sufficiently to take out any faulty spokes and replace the same with others and then to screw up that plate, *g*, and the wheel will be again complete.

Fig. 5, represents a different arrangement for expanding the spokes and felloes. The spokes which are shown edgewise and in part at *a*, *a*, are all placed in the same plane, and held in their places by the plates, *c*, *c*, and bolts and nuts, *d*, *d*, *d*, *d*. If the spokes were arranged so as to form a smaller cone at their interior end than that at the exterior of the box, *e*, *e*, it is evident that by screwing up the nuts on the bolts, *d*, *d*,





the cone, *e*, *e*, would be forced through the conical hole formed by the spokes, and thereby push the whole of them outwards towards the felloe, and so produce an expanding action outwards. The box and spokes when screwed up would appear as at *a*, fig. 5.

Having thus described the nature of my invention of certain improvements in wheels for carriages, and the manner of carrying the same into effect, I would have it understood that I lay no claim to the various parts of a wheel, which are well known; but I do hereby confine my claim of invention to the arranging of the spokes so that they are capable of expanding out the felloes, and thereby offering great facilities in constructing as well as in reparing wheels so formed.

And further, as relates to my improvements in carriages, the same are ascertained and described by reference to the drawings.

Figs. 6 and 7, which represent such parts of a carriage as are necessary to explain my invention, the same letters of reference are applicable to both these figures. *a*, is the axletree of the carriage. *b*, *b*, is a box or barrel (shown at fig. 6, with one of its ends removed to exhibit the interior,) which contains a spiral spring, *c*, *c*, one end of which is attached to the axis, *a*, and the other to the box, *b*, *b*. The action and construction of this spring, therefore, is similar to the main spring of a watch. Round the preriphery of the barrel, *b*, *b*, is wound the leather strap, *d*, *d*, *d*, attached to the barrel at the point, *e*, and to the supporting rod, *f*, *f*, at *g*, which supporting rod is bolted to the shafts (or any convenient part of the carriage) at *h*, *h*.

It is evident, therefore, that if weight be added to the carriage, such weight will tend to depress the body of the carriage by pulling round the strap, *d*, *d*, and causing the box or barrel, *b*, *b*, to turn on the axis, *a*, and thus partially wind up the spiral spring, *c*, *c*. In the application of this invention I make use of two such boxes and springs as shown at fig. 7, and, thus arranged, the motion of the carriage will nearly correspond with that of a carriage with common springs. It will be evident, however, that in this arrangement some apparatus is necessary to prevent the axis from turning round, and also to prevent the carriage from rising and falling in an improper direction. This arrangement is shown at figs. 6 and 7, and may be thus described. Two flat bars of steel, *i*, *i*, are bolted at one of their ends to the flaps of the axis at *j*, *j*, and at the other (by bolts) to the knuckle joints, *k*, *k*. By this apparatus, when the carriage vibrates upon its springs it will describe a curve represented by the red line, *l*, *l*, fig. 6, being a segment of a circle of which the bars, *i*, *i*, are the radii, and the kunckles, *k*, *k*, the centre. The motion of the carriage, therefore, is nearly vertical, and sufficiently so for practical purposes.

Having now described the nature of my invention of improvements in carriages, I hereby declare that I claim as my invention as far as relates to my improvements in carriages, the application of a spiral spring and barrel, as a substitute for the ordinary springs of carriages, and the mode by which the axis is connected to the body of the carriage, viz., by the radius bars, *i*, *i*; and though the parts individually may have before been used in machinery, yet I claim the whole as a new combination, forming an improved substitute for the ordinary springs of carriages. In witness whereof, &c.

Enrolled May 4, 1835.

NEW STEAM-ENGINE.—It is said the Rev. W. Morris, minister of Deanrow chapel, Wilmslow, in Cheshire, has invented a new steam-engine, expense of erecting which will be less than a tenth part of the cost of a steam-engine of equal power, and the expense of working it will be less than one-thousandth part of the expense of working a steam-engine of equal power.

[From the Repertory of Patent Inventions.]

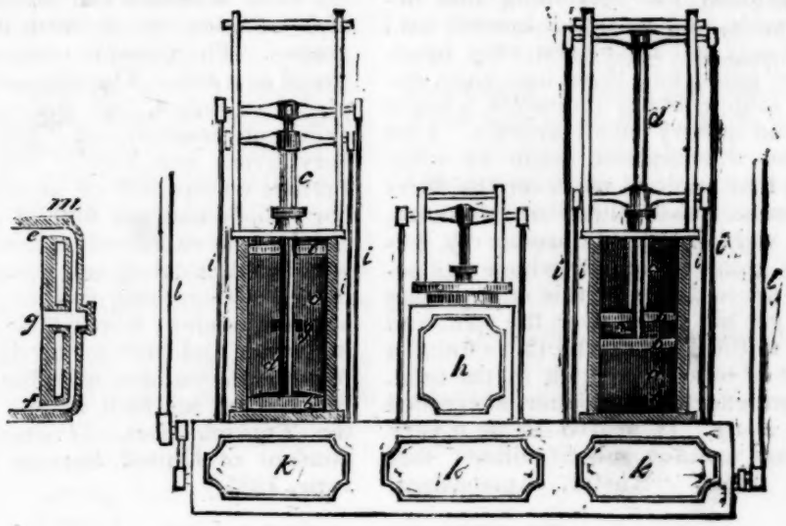
Specificatian of the Patent granted to WILLIAM ALFRED NOBLE, *of Cross Street, Cherry Garden Street, Bermondsey, in the County of Surry, Engineer, for certain Improvements in applying Steam to the common and other Engines.* Sealed December 4, 1834.

WITH AN ENGRAVING.

My improved steam engine consists in having two pistons in one cylinder, by which means the engine is enabled to make double the number of strokes it would do if it had but one piston, consequently double the velocity (or power) is obtained without the aid of multiplying wheels.

Description of the Drawing.

The annexed drawing is a representation of a perpendicular section of the cylinders for a pair of thirty-horse marine engines. *a*, the cylinder. *b*, *b*, the pistons. *c*, the hollow piston rod, with a stuffing box at the end, which admits of the piston rod to the lower piston passing through. *d*, the solid piston rod to lower piston. *e*, the steam port which admits the steam to act on the upper side of the upper piston, *b*. *f*, the steam port which admits the steam to act on the underside of the under piston. *g*, the steam port which admits the steam in the centre of the cylinder to enable it to act on the two pistons. *h*, the cistern which contains the air pump and the condenser. *i*, *i*, *i*, *i*, the connecting rods to the crank, *k*, by which the power of the two engines are united. *k*, the four throw crank, shown by the dotted lines running under the base of the cylinders and condensers. *m*, represents the steam ports above specified, as seen from the other side of the cylinders, and the steam is let on and off in the usual way. *l*, *l*, the connecting rods from the crank of the engine to the crank of the paddle wheels. The steam being admitted through the steam ports, *e*, and *f*, forces the pistons, *b*, *b*, together, the steam is then turned off into the condenser in the usual way, which is unnecessary to describe, at the same time the steam is admitted by the steam port, *g*, between the pistons, the one is then forced up and the other down: the above action is then repeated,



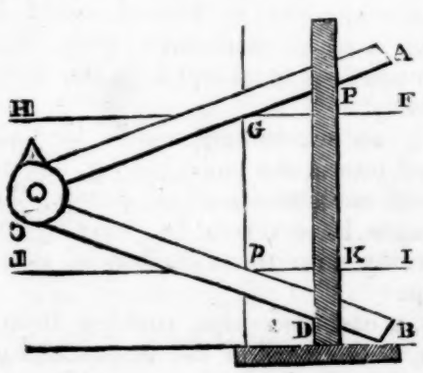
which being connected to the cranks by means of the connecting rods, *i*, *i*, *i*, *i*, the machine or paddle wheel is set in motion.

I would further observe, that I do not confine myself to the operation of two pistons in one cylinder, as more might be employed; but two appear to be sufficient. The same principle of two or more pistons in one cylinder is applicable to engines of high pressure principle. In witness whereof, &c.

Enrolled June 4, 1835.

[From the London Mechanics' Magazine.]

SIMPLE PERSPECTIVE DELINEATOR.—Sir: It is a considerable time since I discovered, and reduced to practice, a ready method of putting plans into perspective, without drawing the usual lines, without finding vanishing points, and without any other trouble than using a very simple instrument with a little care. The following is a representation of the instrument, which is cheap, and is sold by the author.



Let A C B be a variable angle, to move in every position; H F a line for the plane of the picture; and L I a ground line parallel to it; other lines, parallel to the last, may be drawn for different elevations. Let P be any point whose perspective is required; place C A at P, and also a T square, whose side is P D; this done, move the leg C B until the line, I K, falls in the angle P K B; now move the T square into the position G *p*, so that the line G F comes into the angle A G *p*; then the point *p*, so found, will be the perspective of P. The principle upon which the instrument is constructed is, that the elements of perspective depends solely upon similar triangles.

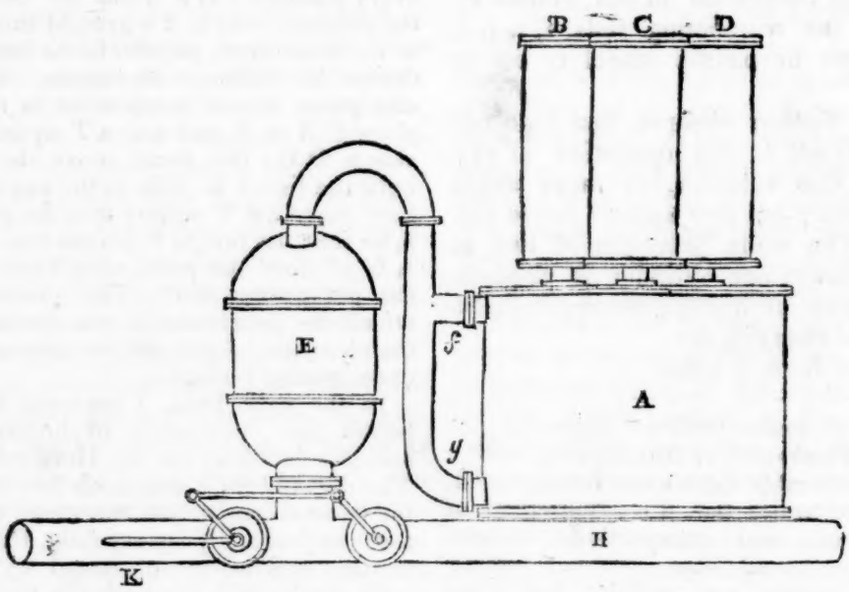
In the year 1821, I invented and made public that description of horizontal perspective called by me the Horizontorium.—The demand for it was such that it was sent for from all parts, and continued in request for four years. Very recently, this very invention has been reproduced by persons who would fain persuade the public that it has just come from France. Some have done even worse than this, for they have published new ones on false principles, and painted them in a manner which is a disgrace to science; any person desirous of seeing a specimen of this has only to look in at the Pantheon, in Oxford street. The horizontorium has nothing beyond common about it; the only peculiarity being that the view is projected on a horizontal plane, in lieu of a vertical one. One eye only should view the picture, and that eye be guided by a hole in a card. The same should be done in viewing every perspective representation, let its plane of projection be what it may.

I am, &c.

W. SHIRES.

MR. DEAN'S SUBMARINE OPERATIONS.—Mr. Dean has resumed his summer amusement of diving to the wreck of the

Royal George, or any other wreck, if requisite; hooking the first thing that becomes portable, and getting it hoisted out; he has already got up eleven very handsome brass guns, and three iron ones, exclusive of some cooking materials, a bottle of wine, and sundry small articles. Last week, upon a complaint made by some fishermen, that while at work on the West Flats, between Ryde and Fort Monkton, their nets were frequently broken by getting foul of some substance which was beyond their art to discover, this enterprising individual got his vessel over the spot, and descended to the bottom; he there found a large piece of ordnance stuck in the mud, and, by great exertion and labor, succeeded in getting it up. It proved to be a very perfect brass cannon, about fifteen feet long; the name, "Koster, Amsterdam, 1636," perfectly legible. The ornaments are most beautiful and chaste; the breech and trunnion are formed in a bunch of grapes. The metal is perfect, and rings as sound as a bell. The shot, on being drawn, peeled in flakes, but the wadding was in excellent preservation. Mr. Dean is of very great use here. The other day a French whaler left an anchor in the harbor which had got foul of the moorings: Mr. D. was employed to raise it, which he succeeded in doing, and got salvage accordingly. On groping further, he got hold of another anchor, worth 20*l*. He has fitted his vessel and boat for foreign service, and towards the autumn will proceed to Navarin Bay, to try his luck among the wrecks of the Turkish fleet.—[Portsmouth Correspondent of United Service Journal, 20th June, 1835.]



[From the London Mechanics' Magazine.]

PLAN FOR PROPELLING STEAM-VESSELS BY THE RETROACTIVE FORCE OF A COLUMN OF AIR.

Sir,—The above sketch represents a plan for propelling steam-vessels by a powerful current of air ejected from the stern of the vessel. Water has been tried in a variety of ways to effect a similar object, but I am not aware of any trial having been made similar to the plan proposed.

A is the cylinder of the air-pump, with three inverted steam cylinders on the top, marked B C D. The piston rods of the inverted cylinders work the plunger of the air-pump, and are attached to it at equal distances from the centre, and at equal distances from each other. The cylinder of the air-pump being 10 feet diameter, it is presumed that three steam cylinders so placed would be a better arrangement than with one in the centre, if even equal to the three in capacity.

E, an air-vessel, which the air is forced into at the passages *f g*, alternately, with each stroke of the pump. Those passages have valves to prevent the air returning into the cylinder of the air-pump.

H, a cast-iron pipe running from the prow to the stern of the vessel, and open at both ends to the water. There are two cocks or valves to this pipe, one on

each side of the air-vessel. When the air is blowing off to propel the vessel forward, the lever K of the hand-gear is in the situation represented in the figure; when the lever is raised a little higher, the air will rush out at both ends of the pipe H, and neutralize the propelling force, and if raised a little more, it will be discharged at the prow of the vessel only. That a power of starting, stopping, and backing the vessel, may be thus gained, is obvious.

If we suppose the air discharged by the pump to be condensed to one-fourth of its original volume, and the cylinder of the air-pump to be 10 feet diameter, with a 6 feet stroke, making 18 strokes per minute, about 4,000 cubical feet of air would be discharged every minute from the stern of the vessel. *Question,* — What would the probable result of such an experiment be, as respects the velocity of the vessel so propelled, to the power expended, when compared with paddle-wheels?

I am, Sir, your very ob't serv't,

J. W.

April 24th, 1835.

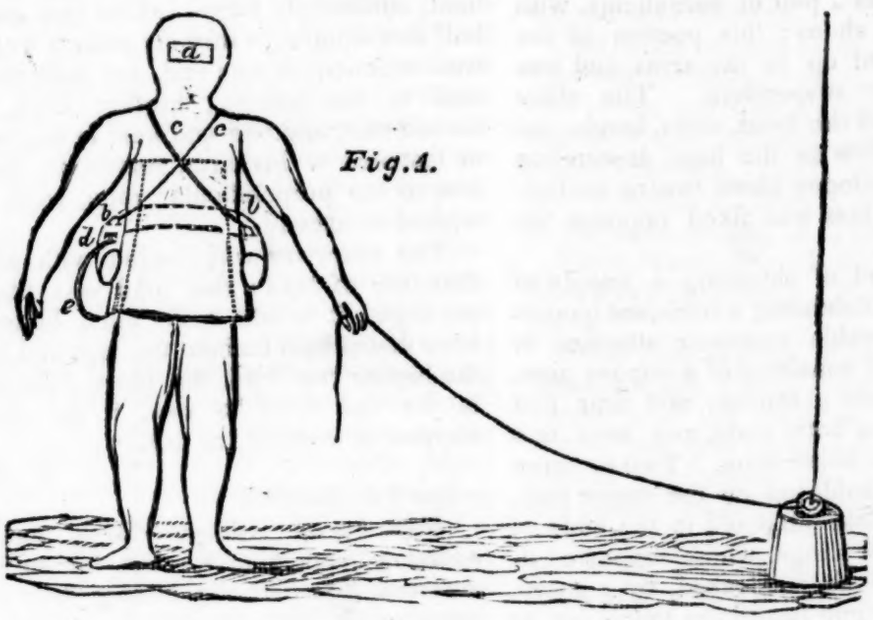


Fig. 1.

[From the Journal of the Franklin Institute.]

Description of a Diving Dress, invented and used by Charles Condert, *of Brooklyn, New-York.*

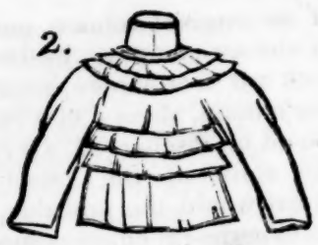
TO THE COMMITTEE ON PUBLICATIONS.

Gentlemen, — The diving dress described in this communication, and the disaster connected with it, have been recalled to my recollection from noticing several recent patents for submarine apparatus. It appears to possess some peculiar features, and seems well calculated for small depth; no metallic or other inflexible material is used in its construction, or in connecting the two portions of it together. It is put on and off with the same facility as an ordinary dress, and, when in use, the body is in full possession of its natural flexibility of motion.

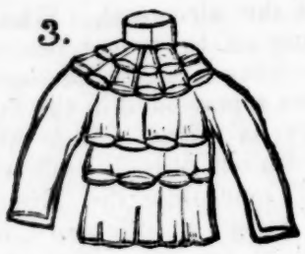
It was invented (and frequently used) by Mr. Charles Condert, a machinist, employed in a factory on the margin of the East river, in Brooklyn, opposite this city. In the docks adjoining the work-shop, he repeatedly decended in it, in from sixteen to twenty feet water. While thus engaged, in August, 1832, he fell a victim to his enterprise. The air in the reservoir had become expended, or, from some accident, (probably by his falling,) it had escaped, as the tube that conveyed the air from the reservoir to the interior of the dress, was found broken, when hauled up. He was, of course, instantly suffocated.

Like Mr. Spalding, the improver of the diving bell, he perished in the bloom of life, at a distance from his family, and in

2.



3.



the prosecution of his favorite pursuits. If a description of his dress be inserted in the Journal, it will probably be the only memorial of this ingenious, persevering, and unfortunate mechanic.

The dress consisted of two parts, made of cloth, coated with gum elastic; the under part was a pair of pantaloons, with India rubber shoes; this portion of the dress extended up to the arms, and was supported by suspenders. The other part embraced the head, arms, hands, and the body as low as the hips, descending over the pantaloons about twelve inches. A piece of glass was fixed opposite the eyes, as at *a*.

His method of obtaining a supply of air, was by condensing a sufficient quantity into a portable reservoir attached to the dress. It consisted of a copper pipe, *b b*, six inches diameter, and four feet long, closed at both ends, and bent into the form of a horse shoe. Two or three staples were soldered on the upper part, to receive hooks attached to the ends of suspenders, or slings, which supported it. Into this pipe he condensed, by a pump, (formed of a gun barrel) as much air as he supposed would be required for the time he intended to remain under water. A small valve cock, *d*, near one end of the reservoir, admitted air into the dress, when required; by opening this valve, a small pipe, *e*, from which entered two or three inches under the lower edge of the upper dress, or jacket, where it folded over the under part. The air escaping from it, of course, entered the dress, and kept it inflated, and prevented the water from entering it.

As the air was respired, it ascended to the upper part of the hood, or covering of the head, and escaped by a small aperture in the cloth, about the size of a pin's head, or less. He intended to use a valve in its place, but found it to act tolerably well. His situation below could always be preceived by people above, from the air ascending perdendicularly over this orifice.

The round part of the reservoir embraced his back, and the two ends projected in front, on each side of him.

When he descended, by a rope passed through a hole made in the bottom of a boat, sufficiently large, (about two and a half feet square,) a fifty-six pounds weight was attached to one end, and suffered to sink to the bottom; another cord, attached to it, and one end held in his hand, or fastened to his arm, served to direct him to the perpendicular rope, when he wished to ascend.

The reservoir was loaded with about 200 lbs. of lead; this load was placed too high; it would have been better to have distributed it about the legs and feet; the higher the load, the more difficult it is for the diver to rise, if he should happen to stumble, or fall.

T. E.

New-York, June, 1835.

Note by the Author.—Might not the ordinary jacket of seamen be so constructed, that portions folding over each other might form receptacles of air, sufficient to prevent them from sinking, when, from accident or otherwise, they fall into water, as is shown at fig. 2? or perpendicular cells might be quilted on them, as at fig. 3, without materially changing the present appearance of the dress. In almost every position in which a person could fall into the water, some air would remain in these cells.

WHO IS A GENTLEMAN?—Coleridge, in his 'Table Talk,' thus describes a gentleman. It is a vivid delineation.

"Whoever is open, generous, and true; whoever is of humane and affable demeanor; whoever is honorable in himself, and candid in his judgment of others, and requires no law but his word to make and fulfill an engagement; such a man is a gentleman, and such a man may be found among the tillers of the earth."

[From the Journal of the Franklin Institute.]

Replies to a Circular in relation to the Occurrence of an unusual Meteoric Display on the 13th of November, 1834, addressed by the Secretary of War to the Military Posts of the United States, with other facts relating to the same question.

By A. D. Bache, Prof. of Nat. Philos. and Chem., Univ. Penn.

(Communicated by the Author.)

Having found that the inference drawn from my observations on the morning of the 13th of November, 1834,* at Philadelphia, was directly opposite to that to which Professor Olmsted had been led, from his observations at New-Haven, I felt naturally desirous to determine what might have been the extent of country over which the unusual display of meteors seen at New-Haven had taken place, this extent having a direct bearing upon the question of the nature of the phenomenon. At my request, communicated through the kindness of the Chief Engineer, the Secretary of War, Gov. Cass, issued a circular to the commandants of the different military posts of the United States, requesting to be informed whether any unusual meteoric display had been witnessed at their respective posts, on the morning of the 13th of November, 1834.

The results of this inquiry, I propose now to put upon record, in as brief a manner as possible. The arrangement adopted in the record, is to begin with the most northern post on our north-eastern frontier, to pass southward along the Atlantic board; then beginning with the most southerly post of the western chain, to pass northward along that chain, then eastward on the northern frontier, towards the original point of departure. Along this line, the display of November 13th, 1833, attracted universal attention.

From Hancock Barracks, Holton Plantation, Maine, Maj. Clarke reports that no recurrence of the meteoric phenomenon of 1833, was observed on the 13th of November, 1834.

A similar report is made by Maj. M'Clintock, in relation to Fort Preble, Portland, Maine, and its vicinity.

No unusual meteoric phenomenon was observed at Fort Constitution, Portsmouth, New-Hampshire, as stated by Maj. Ansart; nor at Fort Trumbull, New-London, Connecticut, as stated by Maj. Saunders; nor at Fort Hamilton, New-York Harbor, according to the report of Maj. Pierce; nor at Fort Severn, Annapolis, Maryland, according to Maj. Walbach; nor at Fort Washington, Potomac river, below Washington city, according to Maj. Mason.

Maj. Churchhill states that at Fort Johnston, Smithville, North Carolina, no unusual meteoric appearrances were noted on the evening referred to in the circular, but that no one was particularly engaged in watching for a recurrence of the meteors of 1833.

Maj. Gale reports from Fort Moultrie, Charleston Harbor, that he can find no one in the garrison, or its vicinity, who has seen any unusual meteoric display since November, 1833; and the report of Lt. Williamson, from Castle Pinckney, in the same harbor, is to the same effect.

Capt. Marchant makes a similar report from Fort Oglethorpe, Savannah, Georgia.

From Fort Marion, St. Augustine, East Florida, Capt. Drane reports that no recurrence of the meteors had been observed, and that no remarkable meteorological occurrence was recorded about the period designated, in November.

No recurrence of the meteors was observed at Fort Jackson, on the river Mississippi, below New-Orleans, commanded by Capt. G. M. Gardiner.

General Atkinson states from Jefferson Barracks, near St. Louis, Missouri, that no occurrence of the sort alluded to in the circular, was observed in the autumn of 1834, by "any one at the post, nor was there such a recurrence any where in the west, as far as [his] inquiries, had extended."

Lieut. Col. Vose reports from Fort Towson, on the Red river, below the mouth of the Kiameche, that no recurrence of the meteors had been observed, as far as he could learn, in the section of the country in which the post is situated.

Col. Dodge, commanding the regiment of dragoons, reports from Fort Leavenworth, on the Missouri river, at the junction of the Little Platt, that no remarkable meteoric phenomenon had occurred

* See Am. Jour. Sc. & Arts, by Prof. Silliman, for January, 1835, p. 335.

since his arrival at the post, on the 27th of September; he adds, that "a recurrence of an event so remarkable as the one mentioned, could not have escaped the notice of the sentinel on post."

From Fort Snelling, Falls of St. Anthony, Upper Mississippi river, Maj. Bliss reports that, from an examination of the sentinels who had been on post during the night of the 12th and 13th of November, he could not learn that any recurrence of the meteoric phenomenon of 1833 had been observed. He gives a particular account of a very bright meteor seen at 5 o'clock, A. M. on the morning of the 9th of January, 1835.

Lieut. Col. Davenport, commanding at Fort Armstrong, Rock Island, Upper Mississippi river, Illinois, states, as the result of information which is satisfactory to him, that no meteoric phenomenon was observed on the 13th of November, 1834, at his post. He gives the temperature at 7 o'clock, A. M. on the 13th of November, as 42° Fah., the wind N. E., and the weather fair.

The reports from Fort Dearborn, Chicago, Illinois, commanded by Maj. Green, and from Fort Winnebago, portage between the Fox and Ouisconsin rivers, N. W. Territory, commanded by Lieut. Col. Cutler, state that no unusual meteoric display was noticed there on the night referred to.

The return from Fort Howard, Menomoniveille, Michigan Territory, is of the same purport, General Brooke adding, that there were several apparent shocks of an earthquake in November, 1834, as evidenced "by a severe rocking of the flag-staff in the night, although it was perfectly calm at the time."

From Fort Mackinac, Straits of Michilimackinac, Michigan Territory, Capt. Clitz reports that he has "made inquiry of the sentinels who were on post on the night of the 13th of November last, and *one* only, an intelligent young man, who was posted at the north angle of the fort, saw a shower of meteors in the north, between 12 and 1 o'clock, the duration of which, as near as he can recollect, was about one hour."

Maj. Hoffman reports from Fort Gratiot, on the St. Clair river, that no recurrence of the meteoric phenomenon of 1833 was observed at his post.

The returns just given are from eleven posts in the Atlantic States, from Maine to East Florida; from six posts in the Western States, or frontier, and from five on the northern frontier; they agree in stating, with one exception, that no unusual meteoric display was noticed on the night of the 12th, 13th of November, 1834.

It is almost needless to observe, that the military stations are places where observation of any striking meteoric phenomenon may be expected, at least one sentinel being on post, the reliefs being posted by a non-commissioned officer, and the sentinels visited at least once during the night by a commissioned officer. Vigilance is particularly to be expected in our out-posts, from which the reports are quite minute. A local "shower" of meteors was observed by a sentinel at Fort Mackinac, about midnight, and lasting about one hour. Many of the reports do not confine themselves to a statement that no meteoric display was witnessed at the posts, but include inquiries made in the vicinity.

These reports may, I think, be considered conclusive against the occurrence of any extensive and remarkable display of meteors, so far as ordinary observation could have detected such a display.

In reply to letters addressed to friends in different quarters, with a view to ascertain if special observation had been made on the morning of the 13th of November, I received the following information.

At New-York, as I learned from Prof. Renwick, a gentleman well known for his scientific attainments, assisted by a friend, watched the during whole night, but saw no remarkable occurrence of meteors. Doctor Gibbons, of Wilmington, Delaware, observed the heavens, in connexion with his observations on the aurora, until about half-past 12 o'clock on the morning of the 13th of November. He informs me that he has been in the habit of inspecting the heavens, frequently, every clear evening since November, 1833, and has observed, often, an unusual number of meteors, for several evenings in succession, and sometimes the reverse of this. The night of the 12th, 13th of November, 1834, was clear.

No unusual occurrence of meteors was

noticed at Baltimore by the city watch, or others, to whom inquiry was directed by Prof. Ducatell; nor at the University of Virginia; nor at the University of North Carolina; at which places, as I learn from Prof. Patterson, and Prof. E. Mitchell, no special observations were made. At Cincinnati, Ohio, the night was cloudy, with showers.

President Lindsley, of Nashville University, informs me that one of the gentlemen of the University was on the look-out on the night of the 12th, 13th, but saw nothing remarkable.

The direct observations made at New-York, Philadelphia, and Nashville, show that no unusual meteoric display occurred at either of these places; and the general experience at Baltimore, and Wilmington, Delaware, the University of Virginia, and the University of North Carolina, was to the same purport. As far as public testimony through the journals can reach this point, it confirms these conclusions.

I infer that the meteors seen at New-Haven, from one o'clock until daylight, by Prof. Olmsted, and the gentlemen who assisted him; at West Point, after 2, A. M. by Mr. Twining; at Mackinac, between twelve and one o'clock, by the sentinel, were not parts of one meteoric display, visible over an extensive region of country, like the phenomenon of November, 1833, but were local.

It is to be seen from the foregoing statements, that the weather was not the same over the extent of country which they embrace, while on the 13th of November, 1833, there was a most remarkable uniformity over a much greater surface.

Philadelphia, May 28, 1835.

[From the Journal of the Franklin Institute.]

On the Action of Hydro-chlorate Muriatic Acid Gas on Silver, at a high temperature. Theory of the Method of Parting in the Dry Way. By M. Boussingault.

(Translated for this Journal, by Jos. Wharton.*)

By the phrase *parting in the dry way*, the old chemists designated an opinion by which they were able, by a long continued cementation, to remove, almost entirely, silver, and the other metals that are found alloyed with gold. This process has its origin in the highest antiquity, and it was not till near the year 1350, that the method of parting by aquafortis began to be at all known throughout Europe; while, owing to the high price of the acids, the use of this process was, for a long time, confined to the laboratories of experimenters, and the operations by the dry way, such as sulphuration by crude antimony, (sulphuret of antimony,) treatment with corrosive sublimate, and cementation with white clay and salt, continued to be employed for the purification of gold.

Since that time, however, among the various results effected by the great progress of the arts dependent upon chemistry, the great diminution in the price of the acids, that followed as a consequence, soon rendered the method of parting in the wet way practicable on a large scale; and it is generally known to what a high degree of perfection the refining of gold and silver is now carried, by the French in particular, so that, at the present day, the ancient processes have been entirely abandoned throughout Europe.

But the European arts, which were established in the new world at the period of its discovery, have remained there so nearly stationary, that I found, not long since, in various workshops, the processes of the middle age. Thus, in establishments as important as the mints of New-Granada, the separation of the silver contained in the gold of the mines, is still effected in the dry way. I could hardly have been placed in circumstances of a more interesting nature than thus to find myself, as I did, among the instruments of the period of the chemistry of the furnace, and even to meet, scientifically speaking, with the men of that epoch. It was as if I had met with chemists, who had just waked up, after a sleep of three centuries.

In the mint of Santa-Fe, cementation, or parting in the dry way, is always employed, when it is desired to free the gold of the mines from the silver that is combined with it, oftentimes in large proportions, so as to bring it to the state of purity required by the law for the regulation of the gold coinage.

The argentiferous gold being first reduced to the granular state, is subjected to the process of cementation in kettles of porous earth. The cement is composed of two parts of brickdust, and one of powdered sea salt, mixed together. A layer of this cement is first spread out on the bottom of the vessel, and is then covered with the granulated ore; this last is then covered with a fresh layer of cement, and so on. The layers of cement should be

* At the request of the Committee on Publications.

about an inch in thickness. A cementing pot contains, generally, from ten to fifteen pounds (French) of gold.

The furnace in which the cementation is effected, is a hollow cylinder, four and a half feet in height; at about three feet from the ground, is placed a grate, on which the cementing pots stand. At the bottom of the furnace, on the very level of the ground, an opening is made, through which the fuel is introduced. This furnace has neither fire grate nor chimney, and the cementing pots are put in and taken out from above.

The operation requires from twenty-four to thirty-six hours, varying with the quantity of silver to be extracted; the cementing pots are kept at a cherry red heat.

The operation being finished, the cement is washed in water, which causes the gold to separate in grains, of about twenty-one to twenty-two carats. These are melted together into bars of a suitable size, for *lamination*.

The cement, after being pounded into a fine paste, is mixed with one-tenth its weight of sea salt, and then amalgamated with mercury. The mercury added is nearly ten times the amount of silver present in the cement. The process of amalgamation is carried on in large wooden troughs, at a temperature varying from 14° to 18° of the Centigrade scale, (57.2° to 64.4° Fahrenheit;) the operation requires from four to five days.

The chloride of silver enclosed in the cement is reduced by the mercury, during the process of amalgamation; chloride of mercury is formed, and carried off in the washings; while the metallic silver amalgamates with mercury. This amalgam is always very dry, on account of the large quantity of chloride of mercury diffused through its mass. The silver obtained after driving off the mercury, is nearly pure, containing only a few thousandths of gold. In the process of cementation, the silver is converted into a chloride by the action of the dry clay, and the equally dry marine salt, a reaction which does not receive a satisfactory rationale from the facts hitherto determined on the subject.

But, however this may be, since the process was attended with success, in the case of argentiferous gold in large sized grains, I determined to apply it to the extraction of silver contained in powedred gold, extracted by washing from pyrites. This gold ordinarily contains 0.26 of silver; but before operating on large quantities, I wished to attempt certain modifications, by erecting a furnace more economical in point of fact, but particularly by the substitution of Cornwall crucibles, for holding the mixed powders, instead of the fragile vessels above referred to, so that the chances of fracture might be diminished as far as possible. With this view, the mixture of powdered gold and cement was placed in a crucible, and exposed for thirty hours to the heat of a furnace, wood charcoal being used for fuel. At the end of this time, the standard of the gold was not sensibly altered; a result which, it will be admitted, was calculated to surprise. I had the patience to keep the powdered gold under the heat for seventy-two hours; but, notwithstanding, the gold was found, after the operation, to contain almost as much silver as before it was subjected to the fire. In a word, all my efforts with good crucibles uniformly failed, and I was forced, to the great satisfaction of the workmen, to return to the *ancient* method of operation. It seemed extremely probable that the access of air was indispensably necessary to ensure the success of the cementation; it was, at least, only in this way that I could account for the advantage presented by badly burnt and porous earthen vessels, over crucibles of a good quality, and, so to speak, impermeable. To satisfy myself on this point, I made the following experiment.

I took two laminæ of silver, weighing each 24.6 grains; one of these I placed in the centre of a small porcelain vessel, filled with a cement of sea-salt and brickdust; the vessel was placed in the centre of a crucible, and covered over with charcoal powder, heaped up around it; so that all precautions were taken to keep the metal out of contact with the air. The other silver plate was, on the contrary, exposed on a cupel containing the cement, and the cupel was placed under the muffle of an assay furnace; so that, in this case, the access of air was facilitated as much as possible. Heat was applied for seven hours; the sheet enclosed in the crucible had not, at the end of that time, materially diminished in weight; it still weighed 24.3 grains; while, on the contrary, that placed under the muffle weighed only 9.5 grains; it had, consequently, lost 15.1 grains. The surface of the second plate was much corroded, and the cement was impregnated with chloride of silver.

The presence of air was thus shown to be indispensable to the success of the cementation; but its action, in the conversion of the silver into a chloride, still remained to be examined. I first endeavored to determine whether sea-salt alone could attack silver at a red heat; but a sheet of this metal, placed in a cupel, under the muffle, and covered over with sea-salt, experienced no alteration, ever after being subjected for three hours to the heat. During the pro-

gress of this experiment, I had occasion to observe the great increase in the volatility of chloride of sodium, produced by the passage of a current of very hot air. The salt, as soon as it was placed in the cupel, (under the muffle,) gave out fumes in abundance, and, in a short time, was entirely dissipated.

It follows, then, from this experiment, that the presence of the clay, also, is essential to the conversion of the silver into a chloride, by the action of sea-salt; and as it is composed of silica and alumina, it appeared worth while to study separately the action of these two substances.

Two liminæ of silver, weighing each 6.5 grains, were accordingly placed in two different cupels; in one of these cupels was put a cement, composed of silica and sea-salt; in the other, a cement composed of alumina, and the same. For four hours, the muffle of the furnace was kept at a heat above cherry red; at the end of this time, the silver in the aluminous mixture had completely disappeared. On cooling, the cement belonging to this cupel was slightly agglutinated; it presented a crystalline structure, but was not sensibly saline to the taste. When first taken from the furnace, it was of a brilliant white appearance, but on exposure to the solar rays, it soon acquired a deep violet tint; the sheet enclosed in the silicious cement still weighed four grains; it presented a very striking crystalline appearance, over the whole extent of its surface; certain points were covered with plaster, so to speak, of an olive green, which adhered strongly to the metal; the parts of the cement that had been in contact with the silver, were of deep brown color. The cement was not saline to the taste, and was almost wholly vitrified. It is doubtless to this last circumstance that the failure of the cementation with the silicious mixture must be attributed.

It is known that, even at a high temperature, silica exerts positively no action upon sea-salt, if the materials be perfectly dry; but the researches of MM. Thenard and Gay Lussac, have shown that the presence of watery vapor immediately determines an energetic action, attached by the disengagement of hydro-chloric acid gas, and the formation of silicate of soda. It is evident, then, that, in the above experiment with the silicious cement, vapor of water was present, since the chloride of sodium was vitrified by the silica. The air, in traversing the muffle of the cupel furnace, must, then, have carried with it a sufficient quantity of watery vapor to establish the reaction. In cementing on a large scale, such as is carried on at Santa-Fe, the cementing materials are constantly surrounded with watery vapors, produced during the combustion of the wood.

To prove that it is really the vapor of water constantly present in the atmosphere, or that produced during the combustion of the fuel, which renders the presence of air necessary in the cementing process, I placed a sheet of silver, surrounded with cement, in a porcelain tube, and, after raising it to a red heat, caused a stream of well dried air to pass through it; as I expected, the silver suffered no change whatever. A difficulty, however, still remained. If, as seemed evident, the vapor of water be the agent that determines the action of the earths on the sea-salt, hydro-chloric acid should, indubitably, be produced; and as we have found that the silver is transformed into a chloride, and no hydro-chloric acid is evolved, it follows, as a probable consequence, that the last named substance is decomposed by silver at a red heat, though this metal is generally supposed to exert no action whatever on hydro-chloric acid gas, even at high degrees of heat; this point remained, them, to be determined. A lamina of silver, twisted into a spiral, was introduced into a tube of porcelain, and placed in a furnace. By one end of the tube was introduced a current of hydro-chloric acid gas, previously dried by passing through chloride of calcium;* at the other extremity was fitted a tube, entering under a bell glass filled with water. When the heat rose to a red, hydrogen gas began to be disengaged, but very quickly ceased coming over, the acid gas then continuing its passage, without decomposition, and the water of the bell glass became acid. On examination, the surface of the silver was found to be covered with a varnish of chloride of silver, and it was clear that the metal had been protected from further contact with the acid by the coating thus afforded it.

* In my first experiments, I did not adopt the precaution of drying the acid; but in consequence of a suggestion that the effects might be possibly due to the decomposition of water, the affinities called into play being those of silver for oxygen, and of hydrochloric acid for the oxide of silver, in which case, the hydrogen evolved would be furnished by the water, I caused the gas, in my succeeding experiments, to pass previously over chloride of calcium. An objection might, however, still be raised; it might possibly be the case, that the gas was not completely dessicated by the chloride, but that a portion of aqueous vapor still remained. To determine whether this be the case, I made use of a test previously employed by M M.Thenard and Gay Lussac. I caused a portion of the dried gas to pass into a receiver of fluoboric acid gas, but the mixed gases retained the transparency they possessed when separate. The extreme sensibility of the fluoboric acid gas, as a hygroscopic agent, was shown by the admission of atmospheric air into the mixture, when a cloud was instantly produced.

To remedy this difficulty, in a measure, the silver lamina was surrounded with alumine, for the purpose of absorbing, as much as possible, the chloride produced. This second experiment succeeded much better than the former, and I was enabled to fill several test tubes with the hydrogen evolved; the exit of this gas under the receiver took place, however, in very small bubbles, and it was easy to perceive, from the strong acidity of the water, that the greater part of the acid still escaped decomposition. The evolution of hydrogen became slower and slower, and soon entirely ceased. The silver, when examined, was found to be much corroded, although the chloride produced had entered but very little into the body of the alumine, and the metal was still covered with a layer of chloride, which was a sufficient reason why the silver had escaped final destruction.

In a second experiment, in which I added sea-salt to the alumine, the operation continued without interruption, although, as in the preceding experiments, the hydrogen was evolved in very small bubbles, and the greater part of the acid passed over without decomposition. The addition, in this case, of the sea-salt, was found to have greatly facilitated the diffusion of the chloride of silver through the alumine, and it is more than probable that the effect is due to the tendency of the two chlorides to combine together. The double chloride thus produced may be formed directly by the addition of chloride of silver to chloride of sodium, in a state of fusion. When thus formed, it solidifies, on cooling, to a low red heat, and, when cold, is vitreous, transparent, and slightly opaline; its taste is saline, and not at all metallic; it is decomposed by the contact of water. Exposed to the solar light, its color changes to a violet.

I further demonstrated the action of hydro-chloric acid on silver, as follows:

A very thin lamina of this metal, weighing 13.3 grains, was put into a cupel, and a current of the acid gas was caused to flow, for an hour's time, under the muffle of the furnace in which it was placed. During the whole of the experiment, a light white vapor arose from the cupel. The silver, after the operation, was found to weigh only 9.5 grains; its surface was corroded; no trace of chloride was observable on the cupel; in this case, the chloride was evidently carried off, at the instant of its formation, by the gaseous stream. It might be supposed, from the power possessed by silver of fixing oxygen at high temparatures, that, during the cementing process, the contact of the air facilitated the action of the acid by furnishing that gas; but a comparative experiment, made with two silver laminæ, presenting exactly the same extent of surface, showed that this is not the case, and that the oxygen of the air does not sensibly facilitate the action of hydro-chloric acid on silver.

The decomposition of hydro-chloric acid by silver, is an analogous fact with that of the decomposition of water by iron. The silver absorbs the chlorine of the acid gas, in like manner as the iron does the oxygen of the watery vapor, and hydrogen is set at liberty in both cases. On the other hand, at the same temparature at which these decompositions are produced, hydrogen gas possesses the property of reducing to the metallic state, the chloride of silver, and the oxide of iron, with the production, respectively, of hydro-chloric acid and water.

When silver is submitted to a continuous current of hydro-chloric acid gas, the hydrogen evolved is immediately enveloped in so large a quantity of the acid gas, that the mixture is too dilute—the hydrogen being considered the active agent—to react on the chloride already formed; the hydrogen, moreover, is rapidly carried off by the gaseous current.

When, on the other hand, chloride of silver is reduced by a current of hydrogen, the inverse is the case; the hydro-chloric acid produced is rendered inactive, by reason of the large amount of free hydrogen present.

To convert silver into a chloride by the action of hydro-chloric acid gas, it will then be necessary to employ a great excess of the latter; and, on the other hand, to reduce the chloride of silver, a much greater amount of hydrogen will be required than is simply sufficient to convert the chlorine into hydro-chloric acid.

The fact of the decomposition of hydro-chloric acid by silver once admitted, the phenomena that ensure during the process of *parting in the dry way*, are readily explained; the clay of the cement, assisted by the presence of watery vapor, reacts on the sea-salt; hydro-chloric acid results, and converts the silver into a chloride. The chloride thus produced combines, probably, with the sea-salt, and forms with it a double chloride, which is absorbed by the mass of the cement, so as to leave the surface of the silver perfectly clean. A fresh portion of the hydro-chloric acid is thus permitted to act on a fresh surface of the silver, and the operation is thus enabled to continue until the latter has been entirely converted into chloride.—[Annales de Chem. et de Phys.]

MODE OF JOINING TWO PIECES OF AMBER.

Two pieces of amber may be very readily united by the following means.

Wet the surfaces that are to be united with a solusion of caustic potash; heat them, and then press them together; the two pieces will unite so perfectly, that no trace of any joint can be perceived. Thus, with small pieces of amber, compact masses may be easily formed, which is an advantage in the arts.—[Journal Franklin Institute.]

NEW METALLIC CEMENT.—A new metallic cement, for which a patent has been taken out, consists of powdered scoria from the copper works, mixed with stone and lime. It sets rapidly, and takes a fine metallic polish. It is now being used by Messrs. Harrison, in a large building intended for an inn, at the south-west corner of London Bridge. This cement, unlike all other kinds except Frost's, is sold mixed up ready for use. The price is 9*d.* per bushel. If the scoria, in a state of powder, were sold by itself compressed in casks, it appears to us that it would form a very desirable cement for exportation. It may be laid on in coats as thin as the fourth of an inch, but it has not been a sufficiently long time in use to determine to what extent it will crack.—[Lon. Mec. Mag.

[From the London Mechanics' Magazine.]

TILLEY'S NEW METALLIC FIRE ENGINE.

Sir,—After witnessing the introduction of boats, bridges, and churches, of cast iron, with many other extraordinary applications of this highly useful material, your readers will not be much surprised at the introduction of cast iron fire engines, and this material enters pretty largely into the machine I am about to describe.

It is well known that hot climates exercise a most injurious effect upon all things constructed of wood, especially if occasional moisture assists the operation of the heat. Among other machines which manifest the existence of this destructive influence, fire engines are particularly liable to dilapidation; sometimes saturated with water, and then exposed to parching dryness—laid by unheeded until required for use—no wonder they are so often found unserviceable. To obviate the serious inconvenience arising from this cause, and to render the fire engine, as far as possible, proof against the effects of climate, Mr. W. J. Tilley, engine maker, Blackfriars road, London, has constructed a fire engine entirely of metal, of which fig. 1 is a side, and fig. 2 an end view. The same letters of reference apply to both drawings. (For the drawings see the two following pages.)

a a a are three cast iron standards, fixed upon a quadrangular floor or framework *b b*, of the same material. *c c* is the main axis working in brass bushes on the tops of *a a*. *d d* are the two brass cylinders or pumps. *e* is the air vessel, of copper; *f* is the suction pipe; and *g* the delivery pipe. A chamber *h* contains the suction valves, the delivery valves being placed in a similar chamber *i* in front of the cylinders. *k k* are the handles, made of sheet iron rolled up, which, by means of the cross levers, impart alternate motions to the pistons.

The pistons are attached by slings to a projecting arm on the axis *c*, the parallelism of the pistons being preserved by guide rods in the usual manner. *l* is the fore carriage.

The whole is mounted on four cast iron wheels, and has rather a light and elegant appearance.

In the construction of this engine not a particle of wood is employed; the valves, the pistons, and, in fact, every part is of metal.

This engine exhibits, in a very pleasing manner, the situation of all the working parts, which, in fire engines of the ordinary kind, are enclosed from view; but a most important advantage consists in the facility with which any little derangement in the machine can be seen and remedied. The valves, which are almost the only parts liable to get out of order, can be got at immediately, as it is only necessary to unscrew and remove the cover of the valve chambers, to examine and repair any obstruction in this part of the machine.

The durability of this description of fire engine, and its fitness for all foreign stations, especially in hot climates, must be so great, that for such services I have no doubt they will in time supersede all other engines constructed of so perishable and uncertain a material as wood.

I remain, Sir, yours respectfully,

London, June 24, 1835. WM. BADDELEY.

TILLEY'S NEW METALLIC FIRE ENGINE.

Fig. 1.

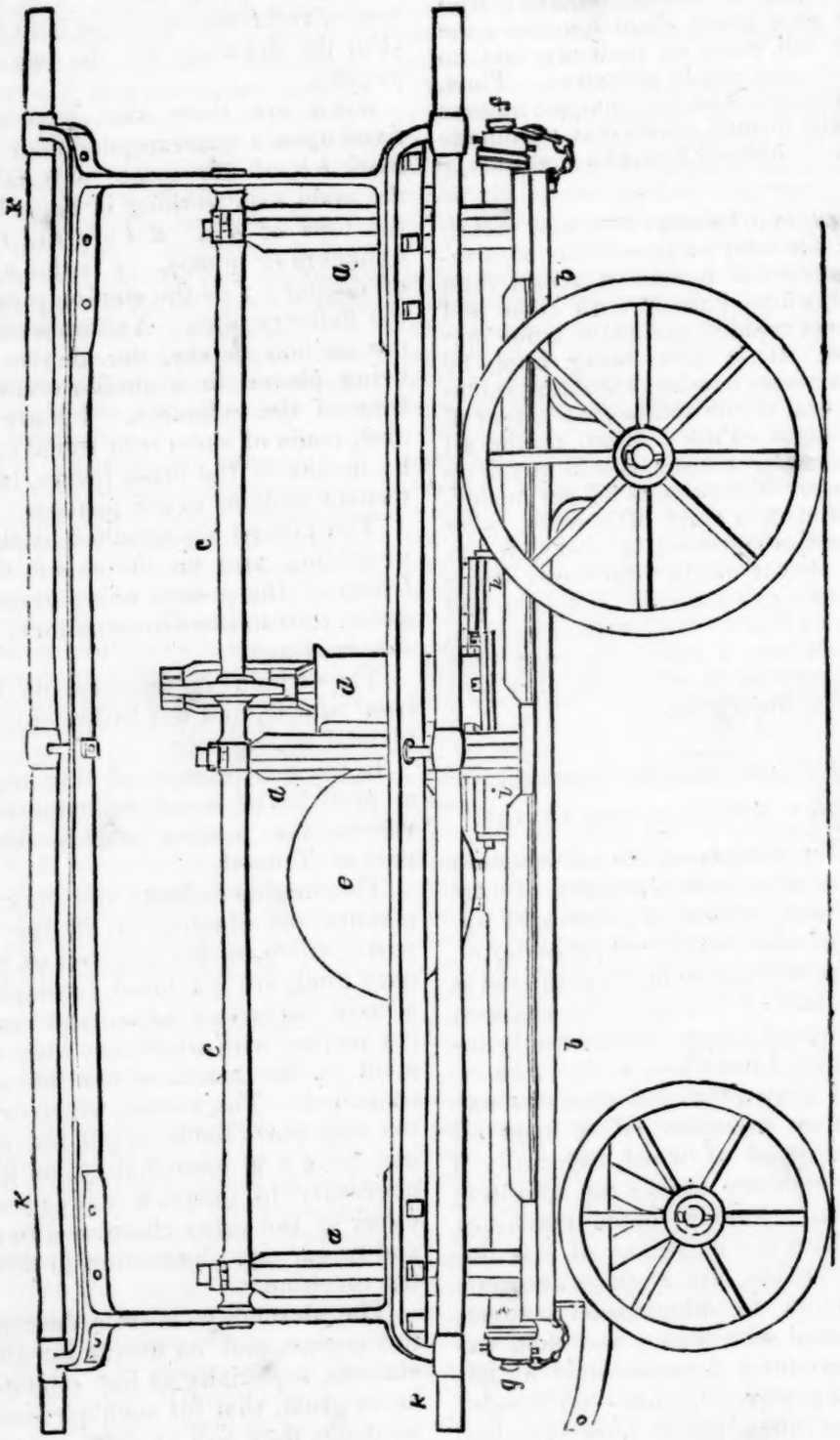
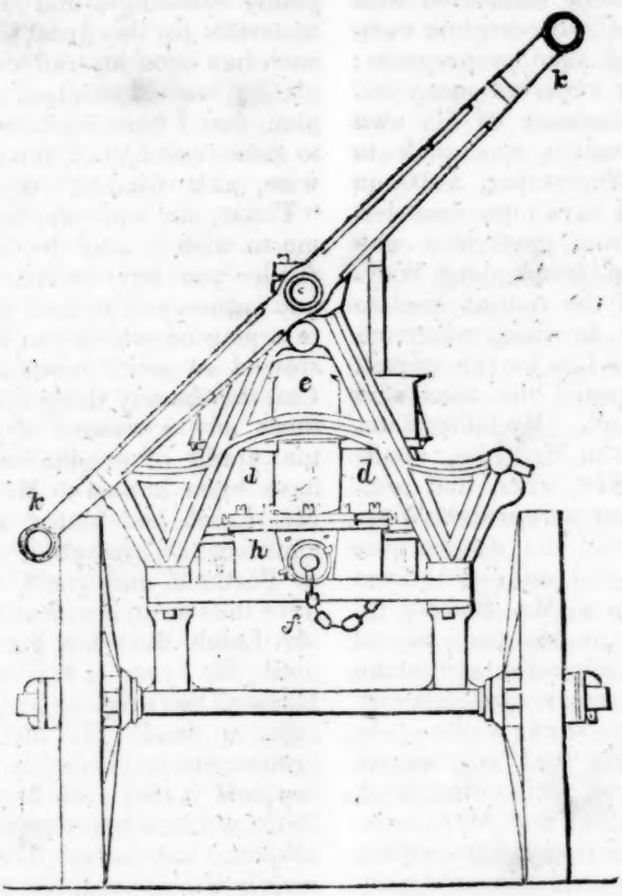


Fig. 2.



[From the London Mechanics' Magazine.]

PORTLAND BREAKWATER.—Sir,—I regret that my official duties have prevented my paying earlier attention to Mr. Lamb's communication, dated 4th March, No. 605; not that I think it a matter of any consequence, as affecting my late father's claim to priority of design for the Portland Breakwater, but lest my silence should be construed as a tacit admission of Mr. Lamb's claims. I take it for granted, that if any communication on a breakwater for Portland roads shall appear to have been made by my father previous to June, 1812, (the earliest period to which Mr. Lamb can carry back his suggestion,) then the originality will rest with my father. Now Mr. Ham, with whom I have had no intercourse, directly or indirectly, for more than twenty years, until within the last fortnight, having seen the correspondence in the Mechanics' Magazine, unsolicitedly wrote a letter, (published in Mech. Mag. p. 269, vol. xxii.) in which he says, "I can add my testimony, that in the year 1800 I frequently heard him (meaning my father) speak of his plan, and give minute details of the same;" and in a subsequent letter which I have received from him, dated 24th May, 1835, he adds—"I can still recollect that he (meaning my father) appeared quite *au fait* in all the details, and delighted to explain them to the nobility and gentry, who so frequently visited his library, when George III. drew such a concourse of them to Weymouth. This allusion, you will perceive, will carry the date of your father's plan even prior to the year 1800. I soon after left Weymouth."

I can mention many other persons who were well acquainted with my father's designs, and to whom he made occasional written as well as verbal communications, in reference to the subject anterior to 1812. A communication was made to Lord A. Beauclerk, in June, 1810. Gen. Donmourier, an engineer of no common order, had also frequent interviews and

conversations with my father on this subject, as being intimately connected with the improvements of our maritime competitors at Cherbourg, then in progress; from him my father received many important hints in futherance of his own ideas. A communication was made to Lord Sidmouth in September, 1810, on the same subject. I have numerous letters to my father from gentlemen who were in the habit of frequenting Weymouth at the time of the visit of his late Majesty, George III., in which reference is constantly made to him as the person who had first suggested the idea of a breakwater at Portland. My father communicated his design to Mr. Idle, confidentially, in June, 1812, when that gentleman was a candidate to represent Weymouth. At that period the subject was generally discussed, and no doubt, from the publicity given to it, Mr. Lamb's intentions originated, as his professional connexion with Mr. Idle afforded him the opportunity of being well acquainted with every transaction, private as well as public, in which Mr. Idle had any share. The slight intercourse which then took place between my father and Mr. Lamb, was not of such a description as to require or induce him to make a confidential communication. The question of originality was never mooted, because there could be no doubt upon the subject. In all my father's extensive correspondence with men of rank and influence, there is but one opinion expressed, namely, that the design first emanated from him. As to my father's silence, on which Mr. Lamb seems to lay so much stress, that merely shows that he was cautious of committing himself to strangers, and that he had not taken any steps to carry his design into execution, because he did not possess pecuniary means sufficient to justify his embarking in so extensive an enterprise. If Mr. Bracebridge *had not known* that my father had possessed plans and particulars before August, 1813, what could have induced him to apply for them? He says, under date August 13th, 1813, "Though dismissed, perhaps, for want of encouragement, from your present intention (pending a more favorable period for such an enterprise,) I am confident a mind capable of forming such a design, could never willingly abandon it. As I understand you had in your possession, plans, soundings, and various requisite materials for this great work, upon which such has been my reflection and contemplation, and consequent admiration of the plan, that I have ventured to mention it to some confidential, scientific, and, otherwise, able friends," &c. &c. Again—"These, sir, were the feelings which led me to wish it may be in my power to render you any service in this matter, and induce you to turn your mind again to a plan on which you have already bestowed so much trouble and attention." Can this be any thing but conclusive? Is there any symptom of a competitor for the credit of origination? Must it not have been known to Mr. Bracebridge, if Mr. Lamb had hinted any intention of claiming the projection of a breakwater at Portland, and would Mr. Bracebridge have thus written with such a knowledge? Mr. Lamb does not put forth his claim until the year 1834, when Mr. John Harvey, the original projector of this design, is dead. If Mr. Lamb had any pretence to originality in this matter, how happens it that even Mr. Idle, so late as 1818, wrote a letter to my father on the subject, addressing him as being not merely a principal, but the only projector of the undertaking? Indeed that gentleman, as well as Mr. Bracebridge, always considered my father as the individual with whom the design for a breakwater at Portland had originated. And so did, I may truly say, the entire population of Weymouth and its neighborhood, since no farther back than July last, 687 of the principal inhabitants signed a petition to his present Majesty in favor of a breakwater based on my father's plan, in which he was distinctly recognised as the *father of the projected undertaking*.

I am, Sir,

Your very obedient servant,

JOHN HARVEY.

Weymouth, June 6th, 1834.

[From the London Mechanics' Magazine.]

THE TELEPHONY, OR MUSICAL TELEGRAPH.—In January 1828, a M. Sudre presented to the French Academy of Fine Arts the scheme of an universal language, formed of the seven musical signs, *re*, *mi*, *fa*, *sol*, *la*, *si*, *do*, variously combined, to which he, therefore, gave the name of

"The Musical Language." A Committee of the Academy, including three of the most distinguished philosophers of the age, MM. de Prony, Arago, and Fourier, reported, that after "causing several experiments to be made and repeated in their presence," they had "come to the conclusion, that the author had perfectly attained the end he had in view, namely, that of creating a *real musical language*;" and that a system of telegraphic communication might be established by means of this language, and the aid of musical instruments, far superior to any hitherto in use, inasmuch as it would enable men to correspond instantaneously with each other at great distances, not only during the most profound darkness, but under circumstances in which even in open day, no communication by visible signals could possibly be carried on.

The invention was afterwards referred by the Minister of War to a Military Commission, of which Baron Despres was President, which made an equally favorable Report upon it. After stating that, in their opinion, "the 'Musical Language' might prove eminently useful in establishing a correspondence between the different corps of an army," they give several remarkable instances in which it might have been the means of saving the French arms from diacomfiture; as at the battle of Busaco, when the attack made by the French troops failed "in consequence of a division, whose march was arrested by a deep chasm, being unable to give immediate information of the circumstance to the other divisions from which it was separated by the abrupt winding of the mountains;" or the affair of Forroren, in 1813, when "the difficulty of communicating promptly and directly in a mountainous country" was the cause of the French army failing in its attempt to raise the siege of Pampeluna.

M. Sudre's invention was next investigated by a Commission of Naval Officers, who reported it to be their unanimous opinion, that "it would be a powerful auxiliary to the means at present used in the navy, and ought to be immediately adopted." From a series of experiments made by this Commission in the bay of Toulon, it appeared that "it only required two minutes to transmit by means of the 'Musical Language,' from one point to another, distant 9,000 feet, three orders taken from the book of signals."

The system was finally submitted to a Committee of all the five Academies of the French Institute—being now in a much more perfect state than when it was first laid by M. Sudre before the Academy of Fine Arts—and from the Report of this Committee, (which was adopted by the Institute,) the following are extracts:

"The Committee are of opinion, that the 'Musical Language,' invented by M. Sudre—

"1st. Furnishes a means of communication capable of expressing all our ideas.

"2d. Either by sounds or by (written) characters.

"3d. At short or long distances.

"4th. Openly or secretly (that is, by using combinations of the signs, known only to the corresponding parties).

"And, 5th. That this system of sounds is not liable, like spoken languages, to change with time, but is essentially unalterable."

* * * * *

"The Telegraph can only be used at certain stations, upon heights, when every thing has been foreseen, tried, regulated before hand and at leisure. It is impossible to make use of it without preparation, and it is perfectly unavailable under a variety of circumstances of time and situation.

"But the Telephony can be put in practice on land in almost every place, by day or by night, without any change in the method, and even more easily by night, on account of the profound silence which then pervades the earth.

"This generality of application acquires additional value, when it is considered that the instrument is of the most portable description; that it is always *at hand in those very circumstances when the greatest benefits would be derived from its use*; and that the persons who make use of it for other purposes would speedily learn to apply it to the one before us; all these conditions are of the highest importance for all practical applications."

The particular "instrument referred to in the last extract is the French horn or trumpet, which may be heard at a distance of three miles, and is that which

would most probably be employed in all cases of distant communication; but of course any instrument capable of expressing the different musical signs may be made the organ of this new language.

M. Sudre is now in London for the purpose of unfolding all the details of his system to the English public; for it would seem that, notwithstanding the various strong reports which we have cited in his favor, he has met with but poor encouragement from the government of his own country. Let us hope that better fortune awaits him amongst us. His system displays in its general conception great ingenuity, and appears to us capable of being rendered very extensively useful.

Extracts from a Lecture on the Preservation of Timber by Kyan's Patent for preventing Dry Rot: delivered by Dr. Birkbeck, *at the Society of Arts, Adelphi, December* 9, 1834.

We have heard persons assert that it appears to them almost ridiculous to suppose that it ever can become necessary, on a large scale, to perform any operation with a view to render timber durable, beyond that of properly seasoning it by exposure to the atmosphere. But is not this mere prejudice? Why should not timber be prepared by a particular process, which conveys something additional into it, and thereby effects a chemical change in its nature, as well as leather is tanned?

"A very effectual procedure has taken place, in regard to one form of animal matter, by the preservation of the skin from natural decay in a process known by the name of 'Tanning.' This process will give a very good idea of Mr. Kyan's invention. Tanning consists in protecting the leather and skin by the introduction of tannin, which is generally derived from an infusion or decoction of the bark of the oak. If no change were produced in the gelating, which makes the largest part of the skin to be immersed in the tan pit, it would undergo certain chemical changes—it would putrify, and lose its tenacity; but if a portion of animal jelly is dissolved in water, and a little of the substance added, similar to the tannin, a combination will take place between the gelatine; a precipitate will follow of the animal matter, which is the tanno-gelatine, or a compound of tannin and gelatine, and is precisely that substance which is formed in the leather, and gives to it durability and power to resist the causes of decay. The same intention exists in the process of Mr. Kyan. It is true he does not act on the gelatine of animal matter, but he does on the albumen: one of the approximate principles of vegetable matter, which appears to have been slightly perceived by Fourcroy, but which was actually discovered by Berzelius, about the year 1813.

"In order to obtain this vegetable matter (*albumen,*) there are various substances which may be employed. The Hibiscus esculentus yields it in considerable abundance: it is a West Indian plant, which Dr. Clarke mentions as adopted in Demerara, for the same purpose, as, in other Islands, the white of eggs and blood are employed in the process of clarifying sugar. The ficus indica, also, if divided at the stem, will exude a considerable quantity of this matter. If the solution of the bichloride of mercury (which is the agent adopted by Mr. Kyan) is added to the vegetable matter, albumen, it will be found, when they come in contact, that decomposition occurs."

"Mr. Kyan, who had been a series of years (since 1812) engaged in trying a variety of experiments on the preservation of timber, was led to the present experiment by having, as he conceived, at length ascertained that *albumen* was the primary cause of putrefactive fermentation, and subsequently of the decomposition of vegetable matter. Aware of the established affinity of corrosive sublimate for this material, he applied that substance to solutions of vegetable matter, both acetous and saccharine, on which he was then operating, and in which albumen was a constituent, with a view to preserve them in a quiescent and incorruptible state, and obtaining a confirmation of his opinions by the fact that, during a period of three years, the acetous solution openly exposed to atmospheric air had not become putrid, nor had the saccharine decoction yielded to the vineous or acetous stages of fermentation, but were in a high state of preservation; he concluded that corrosive sublimate, by combination with

albumen, was a protection against the natural changes of vegetable matter."

"The mode in which the application of the solution takes place, is in a tank similar to the model on the table. They are constructed of different dimensions, from 20 to 80 feet in length, 6 to 10 in breadth, and 3 to 8 in depth. The timber to be prepared is placed in the tank, and secured by a cross beam to prevent its rising to the surface. The wood being thus secured, the solution is then admitted from the cistern above, and for a time all remains perfectly still. In the course of 10 or 12 hours the water is thrown into great agitation by the effervescence, occasioned by the expulsion of the air fixed in the wood, by the force with which the fluid is drawn in by chemical affinity, and by the escape of that portion of the chlorine or muriatic acid gas which is disengaged during the process. In the course of 12 hours this commotion ceases, and in the space of 7 to 14 days (varying according to the diameter of the wood) the change is complete, so that as the corrosive sublimate is not an expensive article, the albumen may be converted into an indecomposable substance at a very moderate rate."

After stating the result of various experiments, Dr. Birkbeck concludes by observing that this discovery is yet in embryo, but that the public benefit that will result from it is beyond calculation. In an *Appendix* the various purposes to which the process is applicable are detailed: such as preventing dry rot, seasoning timber, protecting from insects, applying the process to Canada and British timber, and preserving canvass, cordage, &c. from mildew.

"Canada timber is much more liable to decay than that grown in the northern parts of Europe, and for this reason is never used in buildings of a superior description. The principle of decay being destroyed, as above shown, this objection is no longer in existence; and this kind of timber may now be employed with as great security as that of a superior quality and higher price.

"The same observation applies with great force to timber of British growth, particularly to that of Scotland, much of which is at present considered of very little, if any value for durable purposes, on account of its extreme liability to decay, whether in exposed situations or otherwise. The present process will, therefore, render of considerable value, plantations of larch, firs of all kinds, birch, beech, elm, ash, poplar, &c., which are the chief products of the great wooded estates, and which, when prepared, may be advantageously employed to most useful purposes."

"*Purposes for which the Prepared Timber, &c., would be highly useful.*—Houses, farm houses, out houses. Large timbers, floors, roofs, gutters, &c., furniture, and all joiner's work, preserved from dry rot, and perfectly seasoned. Posts, rails, gates, park paling, fences, hop poles, felloes, spokes, shafts, &c. &c. For these purposes any kind of timber may now be used, instead of the more expensive kinds. It will also supersede, in many cases, the employment of iron, from its acquired durability and greater economy."

The additional expense of preparing timber for buildings, such as farm houses, out houses, &c. in Mr. Kyan's manner is estimated at the very moderate sum of 20*s.* per load.—[Arch. Mag.]

[From the United Service Mil. and Nav. Mag.]

PATENT BRONZE SHEATHING.—There has been delivered this week to his Majesty's Dock Yard here, a quantity of the *Patent Bronze Sheathing*, and directions have been given by the Lords of the Admiralty to sheathe two of the Falmouth packets that may next require coppering, one side with the patent bronze, and the other with copper, so that a comparison may be fairly established of the duration of the two substances.

We have been favored with an inspection of a sheet of the bronze, and certainly it is a most beautiful specimen of manufacture. But notwithstanding its density and polished surface, it is at the same time quite malleable and pliant.

The subject, we are aware, is one of great interest, and we have, therefore, collected the following details relative to this new invention, which, we understand, originated with a French engineer, and was first tried in the French navy in 1829; since which, on account of its superior durability, ascertained by repeated experiments, the French government has

contracted for several hundred tons a year. In every instance it has been found to keep quite *clean*, a point of paramount importance, whilst from its superior hardness, it is not so liable to be rubbed in case of a vessel taking the ground or running foul.

The durability of ancient bronze coins, medals, and utensils, has long excited attention; numerous specimens are found in Egypt, Greece, and Italy. The famous horses of St. Mark, at Venice, are a remarkable instance of preservation; but it was never thought practicable to render such a hard and dense metal malleable so as to convert it into sheets. The beautiful specimen we have seen, proves that this difficulty has been at last overcome.

We are informed that the usual composition of the bronze of antiquity, was copper combined with six to ten per cent. of tin. Bronze is in fact copper hardened, and rendered less liable to oxidation, by the addition of tin.

The wear of copper on ships' bottoms is a mechanico chemical action, inasmuch as its waste at sea is six and a half times greater than in harbor. We should conclude, therefore, *a priori*, that a hard metal, like bronze, would waste less by the friction of the water, than a soft metal, like copper; and the greater duration of ancient bronze, proves that it is less oxidable. There would thus be established a superiority in resisting mechanical as well as chemical action in favor of the bronze. The result of the experiments made in the French navy on bronze sheathing, *very imperfectly manufactured*, as stated in the "Annales Maritimes" for 1830, '31, and '32, goes to prove that when applied to ships' bottoms, the loss in weight of the bronze is less than half that of copper.

It appears now established, that a continued and necessary wasting of the metallic sheets alone secures a clean bottom, and that no galvanic protection is compatible with it, fresh surfaces of the metallic sheets must constantly be presented by the washing away of the scale or oxide; every thing that attaches to the bottom in calms or in harbor, whether seeds of marine plants, or spawn of animalculae, is thus undermined and carried off, leaving the sheathing bright and clean. With the bronze, as with copper, the same continuous wasting is going on, but *with one half of the loss in weight*, owing to its greater hardness and density, and its inferior oxidability. Lead, zinc, etc. foul on ships' bottoms, not because their oxides are less poisonous than that of copper, but because, instead of being washed off, their oxides are adhesive, and eat, (if we may so express ourselves,) into the sheets, thus allowing whatever fastens on the bottom to remain there and increase. Sir H. Davy's protected copper failed for the same reason—there was no oxide formed, the copper did not waste at all, and thus became foul.

There is, however, one obstacle, to the general use of bronze, which those who like cheap articles will hardly get over, namely, it is 2*d* per lb. dearer than copper, which the English patentees, Messrs. Vivian & Sons, state that they are obliged to charge to cover the great extra expense of rolling so hard and dense a metal into sheets, and the patent right; but we apprehend, if on trial the bronze, instead of giving double the wear of copper, gives only one half more, or as four years and a half to three years, this additional first cost will be trebly repaid to the ship owner, as nothing is so vexatious and expensive as putting a ship into dock to get her re-coppered, when she does not require other extensive repairs. On whaling, and other distant foreign voyages, the longer duration of sheathing is a great desideratum. Even the first outlay may be eventually reduced by the use of bronze sheets eighteen or twenty ounces to the foot, instead of copper sheets of twenty-eight or thirty ounces per square foot.

Nearly the whole of the whaling and India ships from Havre are sheathed with bronze, and several have returned from these long voyages with their bottoms perfectly clean, and the sheathing very little worn. It is now extensively in trial on ships from London, Liverpool, Greenock, etc., so that the results obtained in France will soon be severely tested in this country.

We find we have omitted to notice a point of great importance in the sheathing for ships' bottoms, which is, that the wear should be uniform over the whole surface of the sheets. It is well known that copper sheathing is greatly subject to be cor-

roded into holes, and this especially happens when a vessel has been for some time in ordinary at her moorings, so that the sheathing often becomes unserviceable from this cause, although its total loss in weight is very small. This occurred in two instances in the trials made by the French navy, where one side was covered with copper and the other with bronze. Although the vessels had not been out of harbor, they were obliged to take off a considerable part of the copper, whilst the bronze sheathing was quite perfect, having worn uniformly over the whole surface.

Balloon Communication between London and Paris.—We perceive that the grand aerial project which occupied so much of the attention of the Parisian quidnuncs about this time last year, is revived—with this difference only, that the scene of operation, or to speak more properly, perhaps, the starting-post, has been shifted from Paris to London. The projectors who have now taken unto themselves the style and title of the "European Aeronautical Society," announce in the newspapers that their "first aerial ship, the Eagle, 160 feet long, 50 feet high, and 40 feet wide," and which is to be (?) "manned by a crew of seventeen persons," may be inspected at a certain *dock* in the neighborhood of Kensington, previous to making its first trip "from London to Paris and back again;" after which it is to make similar trips to Brussels, Amsterdam, Berlin, Munich, Madrid, &c., till the practicability of establishing an aerial communication between London and the other capitals of Europe, is fully and incontrovertibly demonstrated! The scheme is, after all, only a copy, and that but an indifferent one, of a plan that was proposed as far back as 1796, by an engineer of the name of Campenas, and not only entertained by the French government, but sanctioned by that select body of *savans*, the French Institute. Campenas wrote a long letter to Bonaparte, then General-in-Chief of the army of Italy, from which we extract a paragraph or two. "*General Citizen*,—The artist who addresses you, filled with the most lively gratitude, will erect, if the means of execution be afforded him, a vast edifice, whence, at the conclusion of his labors, there will issue an Aerial Vessel capable of carrying up with you more than 200 persons, and which may be directed to any point of the compass. I myself will be your pilot. You can thus, without any danger, hover above the fleets of enemies jealous of our happiness, and thunder against them like a new Jupiter, merely by throwing perpendicularly downwards firebrands made of a substance which will kindle only by the contact and percussion at the end of its fall, but which it will be impossible to extinguish. Or perhaps you may think it more prudent to begin at once, by forcing the British cabinet to capitulate, which you may easily do, as you will have it in your power to set fire to the city of London, or to any of the maritime towns of England. From the calculations I have made, I am convinced that with this machine you may go from Paris to London, and return back again to Paris in twenty-four hours, without descending. The object I propose is to establish in the great ocean of the atmosphere a general navigation, infinitely more certain and more advantageous than maritime navigation, which has ever disturbed the tranquillity of mankind—to restore the perfect liberty of commerce, and to give peace and happiness to all the nations of the universe, and unite them as one family. By great labor I have surmounted the multiplied obstacles which presented themselves before me; and my progressive discoveries are developed in a work which I have prepared, consisting of about 400 pages, and divided into five parts.'" How lucky for England that the "new Jupiter" had other things on hand, to divert his attention from this most appalling (though not more appalling than *sensible*) scheme of national destruction! — [London Mechanics' Magazine.]

From the Farmer and Mechanic.]

To Dye Woollens.—Last September I was at the exhibition in Burlington, Kentucky, and was much pleased at the spirit shown by the ladies of that neighborhood, in manufacturing so many excellent articles of domestic manufacture for exhibition. For this they deserve great credit; but I observed that in many articles, particularly the carpeting, that though the spinning and weaving were well done, i

most of them the coloring was deficient, which I attribute to their not having proper instruction in that branch of the business, and have therefore made out the following directions for dying, and I hope you will publish it for their benefit, viz:

Woollen yarn may be dyed yellow by boiling it for an hour with about one-sixth of its weight in alum, dissolved in a sufficient quantity of water, then plunging it, without being rinsed, in a bath previously prepared, by boiling black oak bark, (as ground for tanners,) in water; the yarn is to be boiled in this, and turned until it has acquired the wished-for shade; the oak bark should be strained out of the liquid. It would be of considerable advantage to add 1 ounce of cream of tartar to each pound of alum used. After the yarn is dyed it should be well washed in several changes of water.

Woollens may be dyed blue by dissolving one ounce of good indigo in four ounces of oil of vitriol (sulphuric acid.) This must be done in a glass or stone vessel, powdering the indigo before it is mixed with the vitriol; to the solution one ounce of dry pearl-ash is to be added. The yarn must be boiled in a sufficient quantity of water with one ounce of alum, and one ounce of cream tartar, to every six pounds of yarn; the boiling to continue at least one hour; it is then to be thrown, without rinsing, into a water bath containing a greater or smaller quantity of dissolved indigo, according to the shade wished for. In this bath it must be boiled, until it has acquired the color, and then washed.

Green can be dyed by adding as much of the dissolved indigo to the bark bath, prepared for yellow, as with the proper shade. The cloth having been boiled with alum and tartar, as directed for yellow, is to be put into the mixture, and the same method pursued as directed for dying that color. I would observe that there are many methods of dying blue, many of them practically known in the families of most farmers, and therefore will probably be preferred by them, but this method is most certain and most convenient for obtaining a fine green.

A good red may be obtained by boiling Nicaragua wood in water until the color is extracted, and then straining the liquor; the yarn having been prepared in alum water as previously directed, is to be boiled in it in the same manner as directed for other colors. Different shades may be produced by adding a little copperas.

Wool may be dyed black by the following method—first prepare a bath by boiling one pound of black oak bark, to every ten pounds of yarn, in a sufficient quantity of water. In this bath the wool is to be boiled for two hours, it is to be put into a bath composed of three-fourths of a pound of copperas, and two pounds of logwood, for every ten pounds of yarn, and a sufficient quantity of water; in this it must be kept for two hours more, at a scalding heat, frequently taking it out and exposing it to the air during the operation.

A Mechanic.

A Dissertation upon the Running Gears of Railroad Carriages—illustrating some of their most important natural Mechanical Actions, inseparable thereto; and also describing a remedy for the evils set forth in the Dissertation, embracing principles not heretofore known. Also, a concise description of a Turning Platform for Railroad Carriages—a Curvature to turn corners of streets, wharves, &c., and Grooved Rails for the Curvatures, and the general use of the streets. Also, a newly invented Wrought Iron Wheel, for Railroads. By James Stimpson.

In presenting to the notice of proprietors of Railroads my patent for an improvement in the running gears of railroad carriages, it may perhaps be proper for me to set forth the causes which called for this improvement, together with its advantages over any other mode now in use. In doing this it will be necessary to illustrate the true principles of the natural actions and mechanical motions of railroad carriage wheels as heretofore applied; there being several leading characteristics in their operations inseparably connected with them; some of which are prominent and powerful in their effects; and from the observations which I have been led to make, I am well convinced that they are not well understood, for otherwise their ill effects would ere this have been counteracted. I think I am warranted in my conclusions by the fact, that numberless alterations have been made on both sides of the Atlantic in the running gears of railroad carriages, with a view to overcome the difficulties that have constantly attended their operations.

To common observers the application and use of the running gears of railroad carriages appear extremely simple, and unattended with difficulties—merely round wheels running upon smooth iron rails—and at first sight one would be led to believe that such apparent simple and easy movements must necessarily operate without risk of damage either to the wheels,

the carriage or the rails. But, in order to form a correct opinion upon this subject, it is necessary to observe that the natural course of running of four wheels of equal diameter is only in a straight line, when their axles are kept parallel to each other; and that whenever the railway deviates from a straight line, it becomes necessary, as wheels are now applied or geared to the carriage, to overcome a great proportion of their powerful adhesion to the rails. These facts have not been sufficiently taken into consideration by those who have hitherto endeavored to obviate the difficulties attending the passage of carriages over curves, crossings, crooks, and unequal undulations in railways; yet this adhesion, which must be overcome, very often constitutes the first great cause of all those difficulties, and renders it necessary, as will be hereafter explained, that the wheels should be made fast to their axles, especially when in the least conical; and that to prevent an extra liability of running off the tracks, their axles should be always confined in positions parallel to each other, while their flanches and cones are relied upon to keep them upon the rails, and cause them to conform to the course of the railway. It must also be observed, in order to a correct understanding of the subject, that when the wheels are fixed fast, and set true upon their axles, and their axles are kept parallel with each other, they cannot, without the use of great force, be moved in any other than a straight line, but are in fact, as to any lateral movement, like four fixed props or legs—and it must follow of course that the force, that will be requsite to produce a lateral movement, must be more than equal to the resistance offered by the wheels to that movement; or in other words, sufficient to overcome their adhesion to the rails. Hence it will be readily perceived in what manner the stress of the carriage is brought to operate upon the naves, axles, spokes and rims of the wheels: for whatever power is used to overcome the adhesion between the peripheries of the wheels and the surface of the rails, must act upon all parts of the carriage and wheels, and of course react upon the axles, keys and naves in an inverse ratio of power proportionate to the difference between the diameters of the wheels and those of their axles. Now it is well known that this adhesion of the wheels to the rails is proportionate to the amount of surfaces in contact and the superincumbent weight to a certain extent; as has been illustrated by the experiments of Mr. George Rennie, Fellow of the Royal Society, London, and ascertained by him to be equal to forty-three per centum for seven hundred and nine pounds upon a square inch—or for every square inch of wheel and rail in contact.

By a calculation based upon these facts it will be found, that upon rails of the usual width, each wheel of a carriage, with a common load, adheres to the rail with a power of more than three hundred pounds. Now to produce an instantaneous lateral movement upon the rails, three of the wheels, as now applied and used, must slide, while the fourth will only have to oblique a little, or twist as it were, in order to conform to the direction of the others—and, by the way, this obliquing or twisting alone produces a damage to the rails and wheels equal to the force exerted by their adhesion together—and hence the great impropriety of using vibrating axles; for it is well known that they are made to oscillate or vibrate far beyond what is necessary to enable them to follow the true course of the road, besides that produced by every considerable impediment to motion under the peripheries of the wheels. I therefore propose to consider some of the most important effects produced by different modes of construction as they suggest themselves to my mind; and also the remedy.

The natural power of adhesion of the Wheel to the Rails.

The adhesion of one wheel being equal to three hundred pounds, that of three wheels will be equal to nine hundred pounds; therefore, a force more than equal to that resistance must be exerted by something in order to overcome it, whenever a lateral movement is required—and it must be borne in mind that this force, when one wheel has to move all the rest laterally, reacts upon the axles, keys, wedges, pins, or whatever may be used to fasten the wheels to the axles, with a power inversely proportionate to the excess of the diameter of the peripheries of the wheels over that of the axles—which is in most cases as twelve to one, and consequently amounts to ten thousand and eight hundred pounds at the nave of the wheel which produces the movement; and three thousand and six hundred pounds upon each of the others at their naves; and as roads are made in this country with frequent curvatures in different directions, and also with crossings from one track to another, when the power to be exerted is still greater than upon curves, this stress upon the axles and wheels is acting and reacting almost constantly. Who then can be surprised at their early destruction?

The means relied upon to change the direction of the Carriage.

Let us now inquire what means are pro-

vided and used to effect a lateral movement, and to overcome the above mentioned resistance thereto; or in other words, to change the direction of the carriage and cause the wheels to follow the track without force; keeping in mind at the same time that from the causes before stated the wheels will run only in a straight line, and that they are held in that course by the parallelism of their axles and their power of adhesion—that is to say, a power of adhesion equal to three hundred pounds for each wheel at its periphery—and we find that a *single cone* is all that is relied upon to effect the object and to change the direction of the carriage when required.

The amount of the adhesion of a cone compared with that of the tread of the Wheel.

Let us next inquire what power one cone has to enable it to overcome the resistance of nine hundred pounds; which will be the resistance of three wheels when one cone acts alone, as before stated. Now, the power of adhesion being proportionate to the bearing surface and weight, up to seven hundred and nine pounds for each square inch of wheel and rail in contact, it follows that when a cone comes with its obtuse angle in contact with a flat horizontal rail, its bearing surface is thus reduced to less than one fourth of that of either of the other wheels, which, at the moment when the cone begins to act, are upon their treads, its power of adhesion by its reduction of bearing surface is thereby reduced to less than seventy-five pounds. How can a power of seventy-five pounds, acting with no extraneous advantages, produce a change in the direction of the carriage, which is held in its straight course by a power of nine hundred pounds? It must be admitted that it is impossible. It follows then that the wheel on its cone must itself slide as much as its periphery exceeds that of either of the wheels running on their treads; and that it must continue to slide in that proportion until the vertical part of the flanch impinges against the edge of the rail, when the resistance to a change of direction in the carriage will be overcome by main force; that is, by means of the flanch. This will always be the case, unless the full size of the cone on the hind wheel, or a diameter thereof corresponding to that of the front wheel upon the same side of the carriage, comes in contact with the rail in time to act before the flanch of the front wheel is caused to impinge as aforesaid, for then the direction of the carriage will be changed by the joint action of the two cones, which have a leverage power over their two fellows equal to the length of the axles; and as the wheels upon their treads have only to oblique as they roll, and not to slide, they will yield to the action of the cones of their fellows.

When the direction of the carriage is about to be changed or turned from a straight line at the commencement of a curve, the fore and hind wheels on the outside of the curve cannot be in contact with the rail upon equal diameters simultaneously; consequently there must be a sliding somewhere until the hind wheel reaches the point where the curve commences and runs upon its cone to a diameter corresponding with that of the fore wheel: during all which time the strain upon the fastenings and axles must be in proportion to the power of adhesion, &c., as before described. To this cause we may ascribe the early destruction of the wheels by the wearing out or indenting of the surfaces of their cones, and their constant tendency to work loose; and hence also the danger of using large wheels, unless the size of the axles be also large.

The ill effects produced by the cone not being able to change the direction of the carriage in season, and also why it is not changed, &c.

There is one extremely pernicious effect produced by the forcing of the wheels on one side of the carriage upon a higher part of their cones than is necessary before they are able to turn the carriage into the true course of the railway, to which I would call particular attention.

It is a well known fact, and has often been observed by travellers on a railroad, that the carriage will run from one side of the railway to the other, producing a kind of vibratory motion extremely unpleasant to the passenger. This is caused by the cone's not being able to change the direction of the carriage in season as before stated, and which is produced in the following manner: The wheels on the outside of the curve or crook at its commencement having been forced to run upon the very highest part of their cones by the causes herein before enumerated and explained, that is, want of power to change their course, they are in contact with an increased diameter to an extent that causes them to have a tendency as soon as they can act to turn a much shorter curve than that required by the railway upon which they are running: so that they necessarily cause the carriage to give a rank shear across the railway, the true course of the railroad. This vibratory motion will be produced, not only by curves and crooks, but by any unequal undulations or unevenness in the surface of one track of the railway, more than the other: thus, when it becomes necessary for one wheel to describe more space in the

same time than either of the others—and from the causes set forth it cannot do it—there must be a dragging or sliding, which, whenever it does occur, an immense stress upon the wheels is produced, and a proportionately unnecessary wear to both rails and wheels.

The improvement will allow the carriage to change its course of direction with perfect ease.

One of the beauties of my improvement consists in its being a complete remedy for the evil consequences above set forth — for this improvement permits a single cone to change the direction of the carriage the instant it touches upon the rail at the commencement of a curve, and steer it precisely in the course of the railway, without causing the flanches to impinge against the rails, or producing any stress upon the axles, the wheels, or the carriage.

The importance of the improvement at the crossings.

But when the carriage is about entering a switch at a crossing the importance of this improvement becomes immense; for it reduces the force of action or stress between the flanch and switch more than one-half; which is a great security against its running over the switches, and cutting away their top edges or breaking the flanch by the force of the blow.

Large Wheels may be used, &c.

By the application of my improvement, large wheels, if made in a proper form, may be used with safety where the tracks have no very short curves, and without increasing their weight or that of the axles beyond what would be their due proportion for their increased size, without any regard to the stress caused by adhesion, &c. With respect to the size of wheels, there is something to be said in favour of both large and small. Small wheels are lighter, safer in turning short curves, and easier to load heavy goods upon: but the smaller the wheel the less the bearing surface upon the rails: and the more rapidly will both wheel and rail be cut and worn away by the crushing of gravel between their surfaces, and also the metal itself. Small wheels make more revolutions in a given space, which creates more heat at the gudgeon and consumes the oil much faster. They also require more power to move them; and when passing over stones or any uneven places in the tracks, their concussions therewith are much more severe and injurious to wheels, carriage and rails, under equal speed, than when the wheels are large; and therefore they are more unpleasant to passengers both in their actions and on account of the noise they produce. When the roads are nearly level and tolerably straight, I should prefer wheels of thirty-six to forty-two inches in diameter for passenger cars that are intended for speed; and with the use of my improvement wheels of this size will cause less expense per annum, taking every thing into view, than smaller sized wheels.

When the wheels are composed partly of iron and partly of wood, and the stress naturally resulting to wheels made fast to their axles is properly considered, together with the effects produced upon them by the variations of the weather, the immense importance of the easement to motion, and relief from lateral or other strain, afforded by the application of my improvement, becomes the more conspicuous. Indeed for such wheels the use of this improvement is as indispensable as iron shoes are to horses upon hard roads.

The saving of power to a locomotive that would be made by the application of my improvement throughout a train of cars, is worthy of particular consideration; for without it in the same sliding of the wheels, which has been before spoken of, would appertain to each car, and thus the resistance resulting therefrom would be increased to a large amount by the number of cars in the train. It would thus require a proportionate increase of power to overcome this resistance; the exertion of which would produce extra stress upon the engine and boiler, and render it necessary to keep up the fire by an extra quantity of fuel, the excess of which heat is most certain to destroy the fire pipes. Now if the train of cars of the same weight can be moved over the same road with fifty pounds of steam instead of sixty, the saving is more in every respect than it would at first sight appear to be, and more especially in respect to the effects produced upon the engine, boiler, flue, pipes, &c.; for the higher the pressure of the steam the more power is requisite to move the valves, consequently they will wear out faster in all their connecting parts and get out of repair much sooner, and the more liable will the joints of the boiler, the pipes and all parts be to fail: and when the least thing does give way, all operations or movements are brought to a stand. The cost of the locomotives at the lowest estimation, embraces an item of expense which should leave no auxiliary to their duration and safety unnoticed.

The bad tendency of loose wheels — they have no power to guide the carriage.

As a means of avoiding the evils attend-

ant upon the use of wheels made fast to their axles, resort has been had to wheels loose upon their axles—but to this mode of gearing there exist inseparable objections, which prove that the remedy is far worse than the evil; for the wheels themselves are rapidly destroyed at their naves and peripheries—the axles within the naves, with the collars and washers, as well as the rails themselves, are also subjected to an immensely increased wear and tear. Besides these evils there is a great loss of power, for loose wheels have not the power to guide the carriage, and the consequence is that their flanches will continually impinge against the edges of the ails, and thus the flanches and rails will cut each other in proportion to the power of adhesion which the treads of the wheels have to hold the flanches up to the edge of the rails. Nor have loose wheels the power to guide the carriage even when they are provided with cones upon their peripheries; for when the carriage approaches a curve, the front wheel, which first meets it, must run up upon its cone; the effect of which is, not to guide the carriage, but to impede its own motion, for being loose, it acts independently of its fellow wheel upon the same axle, and of course when its periphery is increased, instead of its acting as a guide to is fellow, it will merely describe the same space at the same time without turning so far on its axle. Its own motion is impeded, because in the very act of running up upon its cone, it runs as it were up-hill; and its diameter being increased, it is thereby made to sustain more than its due proportion of the weight of the carriage and load; both of which circumstances produce resistance to is advance. Nor will the direction of the carriage be changed until the flanch of the wheel strikes against the rail, and then the direction will be changed, but the flanch will grind along against the edge of the rail, producing an immense resistance to its own progress, and great injury to itself and the rail.

The facts must be obvious to all who have given best subject a thought. The wheel at the can have no more power of itself to change the direction of the carriage, than the amount of adhesion of the inside of the nave to the axle; which is of itself totally inadequate to the task.

But there are other ill consequences attendant upon the use of loose wheels, some of which I will endeavor to point out. Immediately after the flanch upon the front wheel touches the rail, that of the hind wheel will do the same—when their united resistance to motion will cause that side of the carriage to lag, and if there is any play in the joints of the transverse rails of the carriage where they join to the cheeks, it will cause the wheels on the other side of carriage, (which always run free when flanches of their fellow wheels are in contact with the rail,) to get in advance, and thereby keep the flanches of their fellow wheels crowded up to the rail on the other side, by the course of their own direction, and keep them continually in contact therewith.

The inclination of loose wheels to gather in at the bottom if conical, and the ill effects resulting therefrom, &c.

Again, wheels that are formed in the least conical upon their treads will incline or gather in towards each other at their points of contact with the rails, in the same manner as a leather belt inclines to the largest part of a pulley, and with a power equal to that of the adhesion of the wheels to the rails. This tendency to run in has no other effect upon wheels made fast upon their axles, when both they and their axles are sufficiently stiff or strong, than to keep them upon a constant strain inwards at their points of contact with the rails, and to bend or spring the axles upwards; but upon wheels loose upon their axles the effect is almost incredible, the power exerted upon the axles at the exterior edges of the naves is equal to three thousand and six hundred pounds; for in medium sized wheels the leverage power of the periphery over the inside of the nave is as twelve to one, by which if we multiply the estimated power of adhesion of one wheel, or three hundred pounds, we obtain the result aforesaid. It must be evident to any one that such a power constantly exerting itself, or in other words, grinding upon the axles at the exterior edges of the naves, must soon wear them larger outward from their centres each way. It may also be observed that every time the wheels turn round there must be a constant tendency to oblique from a perpendicular line, if there be any loose play between the naves and axles; for the sides or points of the wheels, which were last in contact with the rails, were of course within a plumb line through their centres when compared with the sides or points immediately above—and they must be as much without that plumb line when at top as they were within at bottom—so that in changing from one position to the other they must be constantly obliquing. Now as three feet wheels turn around five hundred and eighty-four times in a mile, the griping force as before set forth of three thousand and six hundred pounds is constantly acting upon them in addition to the weight of the load, the carriage, and the power necessary to

manage and control the wheels—so that no one can be at a loss in accounting for the early and rapid destruction of the naves and axles, when the wheels are left loose, or for that of the collars and washers within which the naves revolve; and more especially when it is considered that all these movements at the naves, besides being under such a stress of power and weight, take place in a situation extremely exposed to the deposite of dust and dirt; for the wheels generally run so fast that the dirt is thrown from their peripheries up against the carriage or covers of the wheels, and even into the air, whence it falls upon the axles, there to mingle with the oil, to work in between the moving surfaces about the naves, and necessarily to impair them very fast. Thus they soon become so very loose upon their axles as to render their passage through a crossing or round a curvature extremely dangerous.

And again, a mere trifle of loose play between the naves and axles, allows considerable variation from a perpendicular at the peripheries of the wheels, and thereby cause their treads, although conical, to lay flat upon the rails: from whence it necessarily follows, that as much as the inside of the tread is larger than the outside, so much the outside has to be slipped along over the rail to a great loss of power and extra wear of both wheel and rail. To obviate these difficulties in part, one wheel has been made fast upon each axle and the others left loose; but practice at once proved that the stress upon the loose wheel was quite doubled, and its destruction made rapid in proportion—and the use of loose wheels has been abandoned on account of the cost of repairs, and their total inability to guide the carriage.

Thus it is manifest that the natural tendencies of loose wheels are to their own rapid destruction, and that therefore they are inapplicable to the use—and the only remedies supposed to be left to obviate some of the principal difficulties that have been enumerated, was to be found in the use of vibrating axles or small wheels made fast to the axles. It is well known that by a reduction of the size, the stress at the axles would be reduced, and that the risk of breaking them, when it became necessary for any of them to slide, would also be reduced; and this effect was necessarily produced by the change. But they are after all subject to all the extra wear produced by sliding, and to the stress upon the wheels, axles, keys and carriage, which has been already alluded to; that is exactly all that stress in proportion to their size; while at the same time their liability to run off the track is proportionate to the difficulty of changing their line of direction upon the rails at the commencement of a curve.

Vibrating axles—the bad tendency thereof, &c.

I have before said there was an impropriety in using them, and it may be proper here to give the reason. I will first however call attention to the usual and necessary play allowed between the flanches and the inner edges of the rails—this play is about an inch and three quarters, more or less, but the less the better, where the curvatures of the road will admit of it, as from a proper attention to this point alone greatly depends the injury to the road, the carriage, and the liability of running off the road. For example, we will suppose the flanches of the fore and hind wheels, upon the diagonal corners of a carriage, whose axles are confined in a parallel position, to be close up to the rails each way, and that the axles are coupled three feet six inches apart, consequently all the angle across the track that could ever be formed, would be that of one inch and three quarters to forty-two inches; this angle is so slight that when the flanches do touch, their power of action either to injure the flanch or rail, or to spread the rails apart, is of course lessened in proportion to the acuteness of the angle; this position being well understood, that which follows will be fully comprehended. Now with vibrating axles there is need of as much loose play between the rails and the flanches, as is allowed to fix axles, and even twice the distance is allowed; let it be more or less, it is certain that when the axles are allowed to vibrate sufficiently to conform to the plane of the radius of a circle of four hundred feet, and when the fore axle is up to the extreme limits of its vibration on one direction, if the other is exactly square with the frame of the carriage, the angle of the other with the track would be twice as obtuse as the one with fixed axles can be in the same relative position; but if the hind axle was thrown in a contrary direction to the front, which must and often will be the case, even by their own action or the formation of the track, and very often from extraneous causes, such as impediments to motion upon the rails causing a slipping, &c.; then the obtuseness of the angle becomes three-fold, or in other words, it has three times the power to run off the track that the fixed axles have.—Should this position of the axles happen just at a crossing or curve in the tracks, and the curve be across the set of the wheels, then the course of the wheels would be almost at right angles with the line of the road, and the power to run off the rails six times as great as the fixed axles. It also

follows that the power to spread open the track is increased in the same proportion, for when the flanch is locked or hard up to one rail, it can go no further in that direc tion, and the wheels upon the other track act with all their power of adhesion to force the rails apart; hence the lateral strain upon the boxes, or if friction wheels be used, the lateral pressure will be against their backs, acted upon by the ends of the axles, all of which has a powerful tendency to rack and loosen the joints of the carriage; for whenever one axle runs across the other, a constant slipping of the carriage transversely upon the axles takes place, and the lateral pressure against the shoulders of the axles, if they have any, and sides of the boxes, or against the back of the friction wheels, by the ends of the axles, is far more than can well be imagined until the principles of the action is well understood, or the powerful and destructive effects shown by examining the parts. I have seen many backs broken out of friction wheels from that cause alone, vibration —and the greater the play allowed between the ends of the axles and the backs of the wheels, or the shoulders upon the axles and boxes, the greater will be the damage; for the carriage will slide off and on transversely upon the axles, with all apparent ease, as if it weighed but a single pound.— It must be obvious that the greater distance such heavy weights are allowed to move, the more violent will be the injury here spoken of when bringing up. My joint is a perfect remedy for this evil, as my experience has demonstrated.

There are other considerable objections to the use of vibrating axles, to which it may be proper here to allude. They will keep vibrating almost constantly, and cause a continual chafing of the wheels and rails, which the fixed axles would not, producing a very unpleasant sensation upon the minds of the passengers. This constancy of vibration arises from the obtuse angles or rank shear the carriage wheels obtain across the track; for it is certain that one rank shear cannot be overcome or mended without making another, and this is owing to the fact that they must run up a greater distance upon the cones to overcome the shear than the track itself requires; it therefore turns off not exactly upon the line of the road ahead, but across it, and there it meets with the same difficulties, unless it has passed upon a piece of road favorable to its true adjustment. But should the road be unfavorable to such adjustment, then the vibration, and consequently the difficulty, would be increased double, and often three-fold—this could never take place with fixed axles. In order further to illus trats this position, and to show the true cause of this vibration, which is to be found in the position of the carriage or axles, we will suppose the range of the axles to deviate ten degrees from that of the track, and that both axles are parallel to each other, it necessarily follows that the front wheel which first arrives upon the cone, cannot change the direction of its axle, until it runs far enough to gain upon its fellow sufficiently for that purpose, and also to overcome the obtuse angle the carriage or the hind axle had at the outset; so that the distance the carriage will go ahead before it can turn off is much farther than was necessary to properly adjust it to the true range of the track; that is, when the front wheel had arrived upon that part of the cone proper to run the track, the hind wheels had not, and the front consequently has to run enough farther ahead, still upon an oblique direction, to adjust both points, and thus overreaches its proper position by forming a circuit as it were in making the change; and thus having gone too far, it of course turns off the contrary way, and then ensues the same difficulties as before, and so on continually. All that can be said in favor of vibrating axles is that in certain situations they will prevent a slipping of the wheels upon the rails; but the extra wear from the more frequent vibrations, the loss of power, and above all the great liability to break the flanches and to run off the tracks when under much speed, will by far outweigh all the benefits they possess. To use vibrating axles with friction wheels is contrary to the generally received and common understanding of mechanical principles, at least so far as I comprehend them. Indeed the absurdity to my mind is so great that nothing but having actually seen it in use would have induced me to believe it.

An experiment to prove the transverse inclination of conical wheels.

I am aware we have been told by very learned gentlemen in mechanics that when the axles and wheels are so stiff that they cannot spring or give way in any perceptible degree, that the tendency of the wheels to incline or gather at the bottom could not take place, or the separation of the rails ensue, because, say they, when there is a little or no inward movement, no such effect can be produced. I cannot however see it in that light, for I have applied means, and put myself to some expense to try it in a way that cannot deceive. I will here state the result of my experiment, that others may be the better able to judge. In a horse locomotive which I invented some years since, I had wheels four feet in diameter, cast iron naves, wooden spokes and fellows, their

peripheries were turned in a lathe perfectly round and cylindrical, and then tired with rolled iron plates, the flanches bolted upon the sides of the fellows, so as to make them very strong; the hubs were drilled out to fit close upon the axles, and each wheel was revolved upon its axle between collars and a cap: the cap was fixed fast upon the axle, outside of the naves, by a strong key running through it and the axle, and was made as large as the outside of the nave of the wheel; both were turned true and faced up to each other; within each of these caps were two catches, which acted against rack teeth in the face or end of the nave, to turn the wheel. The power of action being applied to the axles, the catches turned the wheels as fast as the axles, but they could turn faster at all times when necessary. In 1829 and '30 I run it with the peripheries entirely cylindrical, and it went perfectly smooth, still, and free from any lateral movement or pressure. Being so well prepared to carry out or prove my views in regard to the transverse action or conical wheels, I paid Mr. George Reader 25 dollars to turn the tires conical. I put them to work, and the instant they started they inclined inwards at the bottom. They had not revolved fifteen times before they made a jump outwards, (to do which it was necessary to overcome the whole adhesion of the wheels to the rails,) and so continued to act as long as I used them; that is the wheels would run in towards each other at the bottoms until the strength of the spokes and rims could no longer yield, and they would then spring outwards to a vertical position. I could perceive there was an easement to forward motion the instant the wheels were upright by the movement of the car, much the same as is observable in steamboats by the engines passing their dead centres. The retardation of the car arose from the outside of the wheels being smallest, and of course having to be slipped upon the rail, while they touched upon the whole width of it, as much as the outside of the wheels were smaller than the inside. As soon as the wheels were upright the greater part of the resistance was removed, as the bearing surface was contracted.—The powerful effect of this action inwards, pressing the naves of the wheels against the collars and washers, was such that I found it necessary to put in washers an eighth of an inch thick nearly every ten days of use, to prevent the wheels from falling in between the rails. Mr. Washington, of the firm of Majors & Washington, made the washers, and he saw and knew the cause of the destruction: I mention his name that he may be applied to if desired. I am well convinced that the damage at the nave and upon the axles, collars, &c. of loose wheels, is so great, (unless their diameters be very small,) that the advantage of their not slipping cannot compensate for the additional cost caused by their speedy destruction, and more especially if the treads be in the least conical.

Let us next inquire why they run in when conical, and not, when cylindrical: The naves being six inches long, drilled out straight in a chuck lathe, and the weight of the carriage, with two horses, and three to fifteen persons, one would think, resting upon the inside of the naves, would certainly have some tendency to keep the wheels upright; for when out of plumb, the bearing, if there were any loose play in the naves at all, must be upon the extreme inner edge of the hub, requiring some power surely to raise it in that position; at the same time the naves were placed between the cap and collars, and keyed up as close to each other, when first in operation, as they could be. Their running in notwithstanding shows that there is a natural mechanical tendency to run in, whether the strength of the wheels and axles yield to it or not, especially when it had to overcome a very great opposition, at the very instant it commenced.

I should prefer to have all that part of the wheels outside of the cone entirely cylindrical, there being but one part of the road where they can be injurious, and that but a small portion of it, and even there it may be remedied by a proper mode of forming the iron plates; the portion of the tracks to which I allude, is the inside rail of a circle. When a cylindrical wheel turns upon a flat horizontal rail the bearing in contact will extend across the whole width of the rail, the outer edge of the inner wheel must therefore be retrogading, or twisting, as it rolls around the curves, nearly as much as the outer edge of the rail is shorter than the inside; but if the inside rails were rolled with an elliptical face, or made thickest on the inner edge, then the bearings might be contracted as much as it might be desired. Under this mode of construction the difficulty would be removed. Should the rails become worn down flat, the cones would also by the same time wear away the inner edge of the outer rails; the rails would then only require to be changed, one for the other, so as to reinstate them nearly as at first.

A reference to common coaches, so as to understand the use of the joint, &c.

Having described the nature of some of the most remarkable and important difficulties that exist in the operations of wheels as now used upon railroad carriages, which

it is the object of my improvement to obviate, it may be proper to make a few remarks upon its utility and easement to motion, in order to make its merits obvious and familiar to those who may not have had an opportunity of becoming acquainted with the operations of railroad carriages: and I will illlustrate the subject by reference to the operations of common coaches. In these it is well known, that the pole at the fore axle is the means by which all the wheels are guided, that all the wheels are loose upon their axles, and that when going in a curved line or direction, the hind wheels follow nearly in the track of the fore ones. Now it will be easily comprehended, that when turning a curve, the wheels upon the outside of the curve must necessarily turn round faster than those upon the inside, because they have to run a greater distance. But suppose the wheels upon the hind axle were made fast; in that case, the wheel upon the out side of the curve, instead of rolling faster, would be dragged along as much as the distance described by the wheel on the outside exceeds that described by the wheel upon the inside of the curve, or if this does not take place, the inner wheel must slide back: for one or the other must necessarily slide, and in either case the stress upon the naves and axle will be the same, and the necessary extra power to turn them, just equal to that of slipping the wheel.

We will now apply the same facts to wheels on a railroad carriage geared according to my improvement, and consider the cones upon the fore wheels, both of which are to be made fast to their axle, as the pole of the coach, and the joint in the centre of the hind axle, as a substitute for the loose wheels on the coach; and it will be readily perceived that the carriage will then turn a curve with the greatest ease; for the joint in the hind axles permits the hind wheels to act independently of each other, and thus enables one to describe a greater space in the same moment of time; thus preventing the necessity of any dragging or sliding of the hind wheels, and thereby leaving the cone of the fore wheel in possession of full power to guide the carriage in the direction of the track: which it will be able to accomplish with as much ease and certainty, as a coach is guided by means of the pole. With this joint the cone of the fore wheel will be much more efficient in guiding the carriage than it would be, if, instead of the joint in the axle, the hind wheels were left loose upon their axle—for when the wheels are made fast, the axle, although it have a joint in its centre, turns with the wheels as if it had no joint, and the bearings of the axle are but two inches in diameter: but when the wheels are left loose, the diameters of the bearings of the axles within the naves of the wheels are required to be nearly three inches, which, by increasing the amount of surface in contact, increases the resistance to the revolutions of the wheels in the same ratio—to which should be added the friction at the end of the naves, against the collars and washers, and the griping or grinding power of the naves upon the axles, produced by the inclination of the wheels to run in at their points of contact with the rails, as before stated, together with the effect produced by the weight of the load and carriage. It will then be clearly perceived by comparing the two modes, that the hind wheels will much more readily conform to the movements and guidance of the cones upon the fore wheels, when they are made fast upon an axle with a joint in its centre, than when they are left loose upon an axle without a joint—for at the joint there is no friction of importance produced by the superincumbent weight. Indeed the hind part of the carriage by means of the joint will yield to the action of the cones as easily as if centred upon a pivot.

It is also worthy of remark, that the joint is two feet and nine inches from the centre of the wheels at their naves, so that it possesses a leverage power, proportionate to that distance, to hold the wheels in an upright, steady and firm position, and save itself from being cut by its own slight movements.

What then can be more simple, safe and consistent in its practical operation and effects, than this joint, to consummate that grand object for the attainment of which such a multitude of changes in the mode of gearing wheels have been made both in Europe and America since the first introduction of railroads—and without it, those changes would necessarily continue to go on; for it has been abundantly evident, that when the durable nature of the materials made use of is taken into consideration, a sufficient remuneration in their increased duration has not been realized. But on the contrary it has been manifest, that there existed some hidden cause of destruction, far exceeding that to which carriage operations upon common roads are comparatively liable.

I have thus endeavored to point out as distinctly and concisely as possible the difficulties necessarily attendant upon the operations of the wheels of railroad carriages as now geared and used; and I am satisfied that the remedy I have provided will be amply sufficient to accomplish the object for which it is intended, and that when carried into operation, it will prove entirely satisfactory and become the standard in fu-

ture operations. I flatter myself that no further alteration or amendment will be requisite, for nothing can surpass it in simplicity and efficiency. For a period of more than four years, I have been engaged more or less in testing its utility in practice, and I am certain that I cannot be laboring under any delusion or mistake as to what I have stated in relation thereto. I have forborne to give publicity to this improvement hitherto from a desire to prove its utility and practical efficiency to my complete satisfaction at my own leisure and expense, as well as to give time to others to try their different projects, that they might perceive how difficult, and yet how important it was to provide a remedy for the difficulties which they have been laboring under, in hopes that when made known they would be the better able and the *more willing* to appreciate its value when understood and realized.

Formation of Wheels, &c.

Before closing my remarks I will observe that the peripheries of the wheels should be made perfectly cylindrical or horizontal as to all that portion thereof designated and known as the tread, and that the inclination and breadth of the conical part of the peripheries should vary according to the radii of the curves in the tracks on which the wheels are intended to run—and the distance between the foot of the cones on each side of the carriage, when it is standing centrally upon the rails, must be a trifle less than the distance between the inner edges of the rail plates; so that running on a straight line of road no portion of the conical part of the peripheries of the wheels shall come in contact with the rails.

My reasons for preferring this form of wheels are, that when running upon their treads or cylindrical faces, which they will always do when the road is straight and both rails are equally level, they will have no tendency to run in towards each other at their points of contact with the rails; and that therefore the naves and axles will be relieved from the stress upon them, produced by that tendency when the wheels are conical—and that while running upon a curve, the cone, by the relief or easement to motion afforded by the application and use of the joint, will follow its own natural course upon the track, and thus all lateral strain will be obviated; and in no part of the operations will there be any sliding, if the wheels be made after the proposed form. When the treads are entirely cylindrical the top of the inner rail should be elliptical to prevent chafing. But particular care should be taken to have the size of the treads of the two wheels, which are to be fastened upon the fore axle, which has no joint, exactly alike as to circumference as it is possible to make them—for if they be unequal the smaller will be thrown upon the foot of its cone as much as will be required to equalize the circumferences of the two wheels, and thereby wear away or indent the face of the cone and leave in it an abrupt shoulder. No caution of this kind will be necessary with respect to the wheels upon the hind axle which has a joint, as the joint alone obviates all the difficulty. This circumstance affords a choice, for equality of size, of two out of every four wheels, to fasten upon the fore axle.

From all these circumstances the liability of breaking the axles or wheels, or of working them loose, will be reduced to a mere trifle. Indeed the hind wheels may be sufficiently secured upon their axle without the use of either keys or pins, by merely staking them up upon the outside of their naves, if the holes within the naves be made to receive the axle, and the axle itself be made a little tapering, that is, smallest at the outside. Even the breaks will produce no stress upon the axle or the naves of the wheels upon the hind axle; as a break can have no influence upon the wheel opposite to that to which it is applied.

I have left several minor points unnoticed, not feeling myself competent to do full justice to the subject; but have submitted to the task thus far from the necessity of setting forth the causes which called for my improvement; and have contented myself with touching upon the most important points, in hopes that the so doing would lead to a full development of the subject by those more competent than myself.

Description of the Joint.

The joint alluded to in the foregoing observations may be constructed in the following manner: The axle intended for the after part of the carriage should be made in two parts, to meet in the centre between the wheels, their ends upset sufficiently to form a flanch, in the finish, say one quarter of an inch larger all round than the axle, and about the same in thickness; they should be turned exactly of a size, as well as the axles outside the flanch, as far as the coupling box is intended to reach, and their ends made somewhat concave below, or a little within the base of the flanches, to prevent any leverage over the centres of the axles, to press them apart. The coupling box should fit the axles exactly, and have a groove turned into its centre sufficiently deep, and wide, to receive the flanches when placed close up to each other. The coupling box may be closed over the axles by screw bolts, and nuts; or hoops may be shrunk upon it, or drove on, and then cut

up a little outside of the hoops, to prevent their slipping off, the box being formed a little tapering each way from the centre, with a projecting ring, or rib round, larger than what is turned out of the inside, to receive the flanches of the axles. Care should be taken that the coupling should be so strong that when fastened upon the axles the strength at the points of junction, shall be equal to any part of the axles. The box should be about one foot long. One axle can thus turn independently of the other, and yet be so well fitted that it shall have no loose play in any direction, except to turn round. It will be seen that when running upon a straight road, if all the wheels were of equal diameters, which, by the by, is very seldom the case, there would be no movement of the axles within the coupling; and when running upon a curve, if the axle was two inches and three quarters in diameters, and the wheels thirty-six, it would there be only in movement, as two and three quarters is to thirty-six, while the distance the coupling is from the wheels, affords so much power over the wheels by leverage, that but a very small degree of stress within the box can be brought to act upon it. Now let us consider the effect of the steering power afforded by the joint: the hind wheels must yield to the slightest impulse, the cones then upon the forward wheels can direct the course of the carriage with nearly as much ease as though they were running by themselves independent of the carriage, thus steering a direct course with the road, and at the same time effecting what was contemplated by the use of vibrating axles, while it avoids the dangers resulting therefrom, and this too, with wheels all made fast to the axles, and the axles themselves kept perfectly parallel to each other, and thereby avoiding all the injury and loss of property resulting from the application of loose wheels, and saves as much of the propelling power in their movements as is necessary to make the wheels slip upon the rails. I have no doubt that one set of wheels with this improvement, will out last two sets, as now used upon roads as serpentine as that of the Susquehanna, or Baltimore and Ohio. No article so trifling in itself in use at the present day upon railroads, can in any way compare with it in usefulness! I have used it under all speeds up to thirty-three miles per hour, and could never perceive a difference in its action.

Description of the Turning Platform, &c.

It may be useful and satisfactory to mention that I have also obtained a patent for a turning platform, to turn railroad or other carriages upon. The platform turns upon a ring projecting underneath, resting upon the tops of twelve conical rollers, while the rollers themselves run upon the top of a cast iron ring of the same size, both of which are near to the exterior of the platform, so that there is no liability of its rocking about; and there is no friction worth mentioning, arising from the superincumbent weight of the carriage and load; which is in practice a benefit about the same as to enlarge the centre of a pivot, so as to extend to the exterior without increasing the friction. The main object of my mode of construction, is to secure a permanent level surface with the adjoining track rails with an easy movement which a centre pivot will not long do; for when worn a trifle at the centre it will cause a great deviation at the exterior from a level; and the foundation is far more expensive, and difficult to keep in repair, to insure a perfectly horizontal position, when acted upon by the centre of the platform only. Those laid in the centre of Pratt street in the city of Baltimore are of the kind above described.

I have also two patents for a mode of turning corners of streets, wharves, &c. One of them is for the application of the *flanches* for that purpose. It is effected by the wheels upon the outer track of the curve's running upon their flanches, while the wheels upon the inner track, run upon their treads, which are about two and three quarters inches less in diameter than the flanches. The other patent is for the railroad plates necessary to form the curvature; and also for *grooved* rails for any parts of the streets, made of wrought or cast iron, so constructed that no description of carriage can be injured in passing in any direction over them. They are indeed a real improvement to the common travel of the streets, at the same time less liable to injury of themselves, than those of any other I have seen.

I have also invented a wheel for locomotive use, and especially for passenger carriages, which is no doubt superior to that of any other known, for the following reasons: From its peculiar formation it may be made lighter by one half, than any other, and at the same time twice as strong. It is composed entirely of wrought iron, excepting the hub, and no bolts or rivets are used in its construction, a desideratum long desired, and sought for. It will unquestionably become the standard for all the purposes where speed and safety are essetial.

[From the New-York American.]

As the attention of our city authorities seems directed to the subject of paving the streets, it has occurred to me to suggest a mode different from

any in use in this country, and which yet seems more applicable than any other to our city. This is the system of laying flat cut stones, nicely jointed, for the wheels to run on, leaving the rest of the road in its present condition. In Broadway there might be four rail ways—if I might so call them—of this nature; two for carriages ascending, and two for those going in the other direction. The effect of this system would be to keep vehicles to their proper side, more than is now practised, and to obviate those disasters so common in our streets. The wear and tear of horses and carriages that would be saved by this mode of paving, would be immense, and would soon repay the expense of the alteration. If it should be objected that these railways, by keeping vehicles in rows following each other, would reduce the whole of drivers to the same gait, it may be answered, that after all, the pavement would be no worse in this respect than it is now; but that, on the contrary, in consequence of the greater order, it would be much easier for fast drivers to turn out. It might, moreover, be advisable to confine loaded vehicles, going at a walk, by law, to a particular portion of the road.

This plan of paving is neither new nor speculative. The streets of Milan are all laid in this way, and those who know that delightful city, will join me in attesting the ease with which they are traveled. In London, moreover, the road from the West India Docks to Wapping has been furnished with a track of this description, by means of which a single horse is able to draw a weight of sugar, which four would not be able to move on the ordinary pavement. X.

[From the same, of Sept. 28.]

City Affairs.—Under this head we publish a communication to-day, that appears to us to present some most important views, as to the necessity of immediately improving the streets, and avenues of the upper part of the island.

It is in this way that lots distant from the thickly settled parts of the city, may be put within the reach of mechanics and young beginners, who have their fortunes to make, instead of compelling them, by high rents, to seek dwellings over the rivers that bound us.

A railroad too, that should bring people down into the heart of the city, is now, we are well satisfied, a desirable improvement. We thought otherwise when such a scheme was first proposed, but the impassableness and dangers of Broadway, by reason of the *omnibusses* and other vehicles, which constantly crowd it, have convinced us, that rail cars, following a given track, from which they cannot deviate, drawn by horses, and announced by bells, as in the sleighing season, would be altogether safer, more convenient, and more advantageous to up-town residents.

[For the New-York American.]

City Affairs.—The recess, which the members of the Common Council took during the month of August, has probably enabled many of them to notice the improvements in contemplation, in the different towns and cities in this section of the Union. They could not have failed to observe that the provisions, as compared with their respective present populations, for future increase, every where else, vastly exceed what our own city exhibits. I have not seen the returns of the census now taking, but computing our population according to the number of lots assessed as occupied, it cannot be less than 285,000, or an increase of 40 per cent. since the census of 1830, which gave 202,960. Supposing the population to advance in the same *ratio* for the next five years, there will be during that period *one hundred and twenty thousand* new inhabitants. The rule adopted by the Water Commissioners, in making their estimates, was to calculate 9-5 persons for every lot of 20 by 70 feet. As the city advances, the ordinary size of lots is enlarged, and many new houses will require more than one lot. It would probably be fair to suppose that in the present 12th Ward, lots will be at least 25 by 100 feet, and that therefore 12,630 lots will be required for the occupation of 120,000 persons; that is to say, of the next five years' increase.—Not only will these be wanted, but, at least, 3000 more for churches, public squares and edifices, including reservations for receiving reservoirs, coal and lumber yards, &c. &c. It is also to be borne in mind, that, owing to the disputed titles, and the desire of proprietors to take advantage of the enhancement growing out of their neighbors' improvements, a large amount of lots are for years, kept out of the market for all building purposes. There are between 23d and 57th streets, the 1st and 10th avenues, only 18,836* lots, which will exceed the additional number required for the next five years, including the computed provision for public purposes, by scarcely more than 3000 lots. It is, therefore, reasonable to conclude that, even if our commercial prosperity does not advance at an accelerated rate, the neighborhood of 57th street will, in five years, be more densely populated than that of 23d street (where the prices, according to locality, range from $1500 to $3000) now is.

What arrangements are made to meet the wants of this new population? The graduation of lots is not legally established above 33d street, and even the adoption of the plans, which have passed one Board, would be but a very partial provision for the growing wants of the city. Some even of the streets below 23d street, and most of those above that line, are as yet unopened by law.—Should the corporation now order, as proposed, all streets below 42d street to be opened, judging from the time consumed by the Wooster street and other Commissions, years must elapse, according to the present system, before any thing effectual is done. In many cases, even when the dilatory action of the commissioners has been overcome, no progress has been made towards giv-

---

* In this calculation, allowance is made for intermediate avenues between the 3d and 4th. 4th and 5th, and 5th and 6th Avenues, two of which have already been partially established by law.

ing a practical operation to the legal proceedings. Thus, in May, 1833, Union Place was opened by law, and assessments paid by individuals to the amount of a quarter of a million of dollars, yet it was not till the autumn of 1834 that any provision was made by the public, for enclosing and embellishing the square; and though the importunities of individuals have at last been so far successful, as to induce contracts for the necessary coping, &c., to be entered into, there is no prospect that any thing effectual will be done, to point out where the square is, till three years have elapsed from the time that the assessments were actually levied. Even when contracts are formally made, their execution, as in the case of 14th st., and of the paving of Union Place, is allowed to be delayed for months with impunity. It may, indeed, be well for landholders to inquire, whether it is not the duty of the Street Commissioner to impose the stipulated penalty on the contractors, and thus diminish, *pro tanto*, the tax to be levied on the parties liable to be assessed for the improvements, and who are the real sufferers by the delay.

Again: the convenience of the people of Yorkville, and of a large adjacent population, who were obliged to go a mile and a half to a dock at the foot of 54th street, in order to obtain their fuel and other supplies furnished by water, led, several years ago, to the opening of 79th street to the East River. Yet, although the assessments on the adjacent property have been long since paid, there is nothing even now to, distinguish that street or road from the neighboring fields.

Let any man visit Brooklyn, or Williamsburgh, (to say nothing of Boston or Philadelphia,) and compare the works there going on, with the perfect inactivity everywhere manifested on this island. The few laborers who are employed, seem to be engaged almost exclusively on the old roads, where their work is in a great measure useless, inasmuch as these irregular lanes are unknown to the legal map of the city, and must be closed on the opening of the Avenues. If complaint is made to the public administrators, by citizens whose whole fortunes are staked on the prosperity of this great commercial emporium, the only reply which is vouchsafed is, that "Brooklyn and Williamsburgh pay higher wages than we do, and therefore take off all the hands." It is obvious that if wages have risen, we must pay as others do, and no one can regret that every class of citizens, should participate in the exuberance of our prosperity. It is infinitely better for the owner of property, by whom in most cases the expense of public improvements is exclusively borne, to contribute a little more than formerly, and have the work promptly done, than it would be to have the streets in front of his lots gratuitously graduated and paved, half a dozen years hence. To the prosperity of the city the difference is incalculable.

Much has been said, during the last two or three years, in the Common Council, by the representatives of the upper wards, as to the importance of placing the Custom-house in a more central position, and against increasing the facilities of communication with Brooklyn. The writer of these remarks has always believed that in the great commercial emporium of the United States, provision should be made for the office of government, on a scale of magnificence commensurate with the revenue received here, and the future, as well as present, business of New-York. He has, also, been of opinion, that, while the people of the opposite shores have their places of business within our corporate limits, and derive from this city their means of living, they should be made to contribute proportionably to those expenses, which are incident to the seaport, by which they are sustained.—But so far as regards the bearing of these matters on the prosperity of the city, or of the upper wards in particular, they are insignificant in the extreme, compared with the importance of giving efficiency to the Street Commissioner's department. Where are the lots on this island, the graduation of which is settled, and which are susceptible of immediate occupation, that are within the reach of men of small means, and who wish to put up houses for their own accommodation? Scarcely a lot, on the streets opened by law, and within the range of graduation, can be purchased for less than $1,500 or $2,000. Hence, by our own acts, a large portion of our industrious population are driven to the opposite shores, and New York is deprived of citizens, whose future accumulations, though deduced from our unrivalled position, will never contribute to the alleviation of our city taxation, or to the augmentation of the property of those, on whom falls exclusively the burthen of sustaining the commercial emporium.

It is not intended by any thing here said, to derogate from the merits of the present Street Commissioner, who, it is understood, is about to retire from an office, for which he undoubtebly possesses eminent qualifications. But, views of policy and a system of organization, which would suit a town of 60,000 inhabitants, are scarcely adapted to a city of 300,000; and if the officers of the Corporation have not kept pace with the advance of our city and country, they have only erred in common with most of the men of the last century. The time, however, has arrived, when it is necessary for our municipal authorities to arouse from their lethargy, or to acknowledge as sober realities, what we have been accustomed to regard as the visionary dreams of our neighbors—that "the sceptre has already departed from Judah," and New York become a suburb of Brooklyn.

A New Yorker.

There is no species of stock of greater importance to the agricultural interest than the hog. His flesh is the most important item in animal food; he is far more prolific than any other large domestic animal; he arrives at maturity in less time than any other, except the sheep; with half the expense, in proportion to his value; and is much less liable to disease, indeed he can scarcely be considered liable at all. And if we cannot ride him as we do the horse, milk him like the cow, or wear his clothing as we do that of the sheep, still every part of him is valuable; and the short period of his life returns us the pay for his keeping at shorter credit than any other large domestic animal. And yet there is no other animal so completely neglected. In many

parts of the country, a stranger to our customs would suppose, from the treatment they receive, that they were wild animals, and that the people were at considerable expense to maintain dogs, not merely to guard against them, but to worry and destroy them. To any person of a cultivated mind, and who knows the value of the swine, it would be difficult to tell which feeling would be strongest, disgust to see the lean, raw-boned, slab-sided, and long-legged specimens, with long lop ears, which infest our streets, seeking something to keep them from starving; or abhorrence of the cruelty they suffer, in having their ears torn from their heads, by dogs trained to the business; and from whose teeth they are scarcely ever a moment secure.

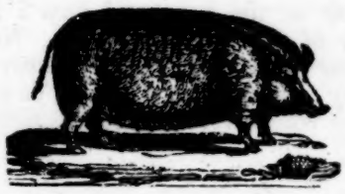
I cannot help thinking the man, who sets the example of reforming this horrid neglect and ill treatment of so valuable an animal, not only by improving all its improveable points, and thereby greatly enhancing its value, but by so doing, rescuing the poor suffering animal from a state of incessant torment during the short period it is permitted to live, deserves at least the thanks of every person, who loves profit and good eating, or who hates cruelty.

Having been long and deeply impressed with such a view of the subject, it has given me extreme pleasure to examine Mr. Bement's pigs, referred to in the following communication, as I think he has arrived at, or very near, the *ne plus ultra* of improvement. Their form is improved in every point. They are small eaters, their growth is rapid, and their appearance shows that their pork must be delicious. I am confident no agriculturist, who has any pretensions to common sense, could see them without being anxious to obtain the breed.

S. Blydenburgh.

[From the Cultivator.]

Improved China Hogs.—Mr. Buel, Sir: Having had frequent applications, by letter, for a description of my *improved* breed of China hogs, I know of no better method of conveying a correct idea, unless by personal inspection, than by a likeness, which I have procured, and accompanies this.



The drawing was taken from a young sow, 9 months old, when in high condition.

This superior breed of swine, as I have observed in a former communication, was first introduced here by the late Christopher Dunn, Esq. Some ten or twelve years since, when passing through Princeton or New-Brunswick, N. J., in the stage, his sagacious eye was attracted by a beautiful sow, with her litter of pigs, running in the street. Delighted with their appearance, he was determined to possess some of them if possible. He accordingly applied to the driver of the stage to procure a pair of them for him. As an inducement, and to insure success, he offered him the liberal price of twenty dollars, for a male and female, although only eight weeks old, on their delivery to a certain house in New-York. They were of course procured and delivered, and from these two have sprung my "*Improved China Hogs.*"

Their color is various, some white, black and white spotted, and others blue and white. They are longer in body than the pure China breed. Upright or mouse-eared, small head and legs, broad on the back, round bodied, and hams well let down. Skin thin—flesh delicate and fine flavored.

They are easy keepers, and of course small consumers, quiet and peaceable in disposition, seldom roaming or committing depradations; keep in good condition on grass only.

They are not remarkable for size, seldom attaining more than 200 to 250 pounds, although instances have occurred where they have been made to reach 350! Therefore, they cannot, in their pure state, be called the "farmer's hog," but their great value is in crossing with the common hog of the country. A very good hog may be obtained by a cross with your *land shads*,—your long legged, long nosed, big-boned, thin backed, slab-sided, hungry, ravenous, roaming tormentors, that will run squeaking about the yard with an ear of corn in their mouths.

To give you some idea in what estimation they are held by persons who have procured them of me, I have taken the liberty of making the following extracts from some of their letters.

"My Chinas, the true *Bement* breed, exceed all praise; you never saw their equals. I have a young boar in the pen, nine months old, that I will show against the United

States, out of the boar and sow I had of you, both of which I still keep. Nothing can compare with them in this country, and I honestly assure you, I never saw their equals any where, for all needful qualities in the hog."

"Dear sir—I have the satisfaction of saying to you, that I got my little Berkshire and China home in good order, and doing finely, and are much admired by every person who sees them. Should I meet with success in rearing from this pair, shall not be able to furnish any thing like the quantity spoken for."

In another letter a valuable correspondent says—"The hogs I had of you have done admirably, and I am getting a fine stock of them; but on the whole, I like the full bred improved China better than the cross, and I am getting back into the pure blood. The young sows, of which I have three from the white (Hosack) boar you had, have had pigs from the old boar, but they are not true enough in blood, appearance, and shape, to suit me; whereas the mother, who is the true China, brings the pigs from the old boar, both in color, shape, size and every thing, as if they were cast in the same mould,—and that is what I like,—uniformity of appearance, even in hogs, and this boar, let me tell you, has the admiration of all who have seen him, as the best and most perfect *hog* in the country. These hogs, 'tis true, are not large, they are indeed rather small; but they are the easiest kept of any according to their size, that I ever saw, and so far as I have yet seen, I prefer them, even to the Bedfords, or any I know. The Bedfords are good, but they are too heavy headed, long legged, and great eaters, to suit me altogether. The quiet, peaceable dispositions of the Chinas, like that of the short horn cattle, is a great item, I assure you, in a farmer's account."

I might fill a page with similar extracts, but I think it unnecessary, for I shall not be able to supply all my orders until next spring.

In the next No. I propose to furnish you with a portrait of one of the Berkshire breed, of which I am now in possession, imported by S. Hawes, in 1832.

C. N. Bement.

Albany, Sept. 1, 1835.

[From the Cultivator.]

On the Utility and Best Method of Cooking Food for Domestic Animals.—This subject has engaged the attention of practical men in Europe and in this country for many years, and it is a branch of rural economy at all times worthy the careful investigation of the farmer. The Highland Society of Scotland have, in a particular manner, directed the public attention to the comparative advantages of feeding farm-stock with prepared or unprepared food, and have, by liberal premiums, induced numerous experiments to be accurately made, and elicited much valuable information. The conclusions which have been drawn from these and other experiments, seem to be,—

1. That a great saving, some say one half or more, is effected by cutting the dry fodder for horses and neat cattle, and feeding it with their provender or grain, in two or three daily messes, in mangers. Not that the food is thereby enhanced in its inherent properties, but that given in this way it all tells—is all consumed, all digested, all converted into nutriment. There is comparatively none wasted, or voided, without having benefitted the animal. In the ordinary mode of feeding in racks, yards, and in open fields at stacks, it is well known that much is lost, from the difficulty of masticating uncut hay, straw and stalks, and from its being trodden under the feet of animals and spoilt. Much labor is besides saved to the animal, as cut food requires less mastication, and the animal enjoys a longer period of rest.

2. That grain and pulse, as cattle food, is enhanced in value by being ground or bruised before it is fed out, so much as to warrant the expense of sending it to mill, and the deduction of toll. Indian corn, oats, rye, and other grain, given to farm animals in a dry, unbrokrn state, it must have been observed by every one, particularly when the animal is high fed, are often volded in a half or wholly undigested state, and are virtually lost. This does not happen when the grain has been ground.

3. That although roots, as ruta baga, mangel wurzel and potatoes, are improved as fattening materials for neat cattle, by cooking, the advantages hardly counterbalance the extra expense of labor and fuel.

4. That for working horses, cooking the roots we have enumerated, and feeding them with cut hay and straw, is of manifest advantage; and that thus fed, they supersede the necessity of grain.

5. That in fattening hogs, there is decided economy in grinding and cooking the food. The experiments upon this subject are many and conclusive. Some estimate the saving at one half the quantity of food. Taking into account the various materials on a farm, which may thus be turned to account, we are satisfied that one half the cost of making pork may in this way be saved. Swine are voracious animals, and will eat more than their stomachs can digest, unless assisted by the cooking process. There are upon the farm many refuse matters, as

pumpkins, squashes, small potatoes, early and defective apples and apple pomace, which are of little value, except as hog food, but which, if well husbanded, cooked and mixed with ground provender, contribute essentially to cheapen our pork. It has been questioned whether the articles we have enumerated are nutritive to pigs, when given in their raw state; while all admit, who have made the experiment, that they are highly so when cooked. Cooking undoubtedly adds to their nutritive properties, as it does to the nutritive properties of Indian meal.

Before we offer our views of the most economical mode of cooking food for hogs, and of the apparatus to be employed, we beg leave to submit the plan of a hog pen or piggery, which, with some modifications, is the model of one we examined at the Shaker village in Niskeuna.

Fig. 1.

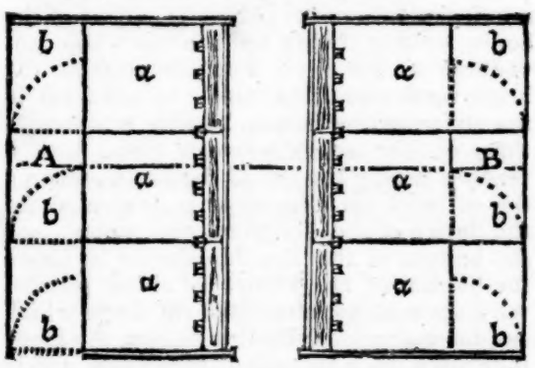


Fig. 1, exhibits a ground plan of the building, showing a gangway in the centre, with a range of pens on each side. The breadth is 26 feet, and the length may be adapted to the convenience of the builder. The pens are six feet broad and ten feet deep, with a cross partition four feet from the rear, and a four feet door, which is used to close the passage between the front department, (*a*) and the department *b*, or to extend the partition between the pens. The different uses of the doors are shown on the two sides in the cut. The pens are calculated for four hogs each, and the section here exhibited will therefore accommadate 24. When the pens require to be cleaned, the doors are shut into the cross partitions, as at A, so that the rear presents an uninterrupted passage, the hogs being confined in *a a*; and as soon as the pens are cleaned, these doors are thrown back as at B. The troughs are embraced in the gangway.

Fig. 2, shows a cross section along the dotted line A B. The partitions are three and a half feet high, the posts eleven feet, giving seven feet to the basement, and four to the upper story, below the roof. The position of the feeding troughs is here shown. They are provided with lids, hung with stout hinges above, and may be let down so as to exclude the hogs from the troughs while they are being cleaned or replenished with food, or raised up, at pleasure, as shown in this section. Each lid is provided with an iron bolt, (fig. 4,) which works in staples, and confines the lid in the position required. This section also shows the slope of the floor in *b b*, so constructed that the urine may drain off. The dotted lines represent the size of the building, when, instead of the apartment *b b*, it is wished to let the hogs run in an open yard. For small farmeries, a single range of pens and the gangway may suffice. The loft serves as a store room for hog food, &c.

Fig. 2.

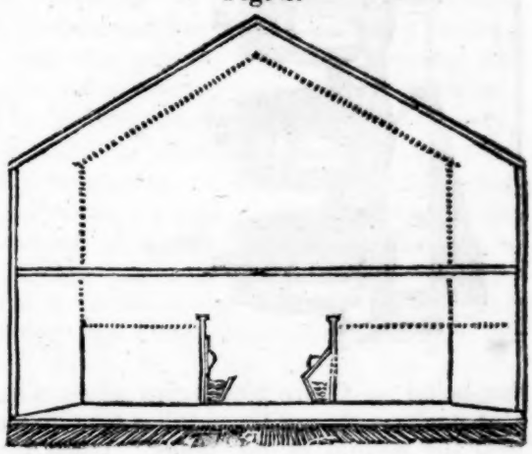


Fig 3 Fig 4

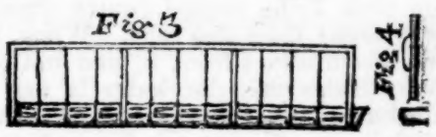


Fig. 3, is a section along C D, showing the studs that prevent the interference of the hogs while eating.

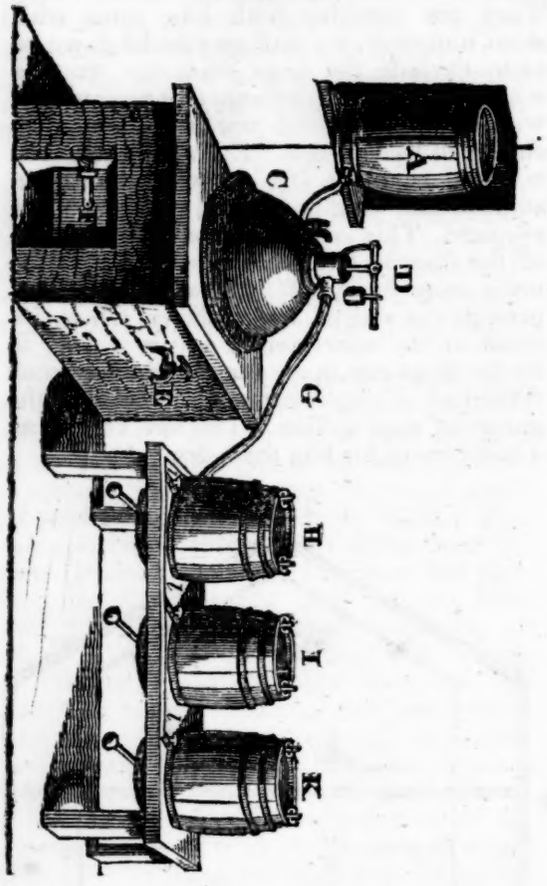
The boiling or steaming room is in one end of the building, and communicates with the passage and the loft.

The peculiarities, or rather the advantages of this piggery, consist in the facility which is afforded of cleaning the pens and the troughs, and of depositing the food in the latter, without being incommoded by the hogs, and in preventing the hogs worrying each other.

We shall now exhibit the model of a steaming apparatus, calculated for a large establishment. We have shown the plan to an intelligent master in one of our furnaces, who estimates the cost of boiler, pipes, and cocks, at $50.

"A is a barrel or other vessel for containing water and supplying it to the boiler C. D is a safety valve. At the upper part of

Fig. 5.



the boiler at C are placed two tubes, with stop cocks. One of these tubes terminates near the bottom of the boiler. Upon the stop cock being turned, water should always issue from this tube. When, therefore, steam issues from it, and not water, this indicates that the water is too much boiled away, and consequently that there is a deficiency of water in the boiler. The other tube terminates within the boiler, near the top. Upon the stop cock being turned, therefore, steam ought always to issue forth. But should water in place of steam come out, then it will appear that the boiler is too full of water. In this manner the attendant, by turning either stop cock, ascertains whether there is a deficiency or excess of water in the boiler. The quantity of water could indeed be regulated by other means; but that described will be found sufficient in practice. F is the furnace, and E is a pipe with a stop cock communicating with the boiler. When it is wished to obtain hot water, it is obtained by this pipe. A pipe G communicates with the barrels H, I, K, and conveys the steam to them; and in these is placed the food to be steamed. By means of the stop cocks *l*, *l*, *l*, the communication can be cut off with any of the barrels, so that the steam may be admitted to one barrel or two barrels, or three, as may be wished. The barrels in the figure are three, but the number may be extended. Each barrel has a moveable lid, which is kept down by screws, and a sliding board below, by which the food, when ready, is withdrawn. The barrels are raised on a frame, so that a wheel barrow or vat may be placed below, and the food at once emptied into it."

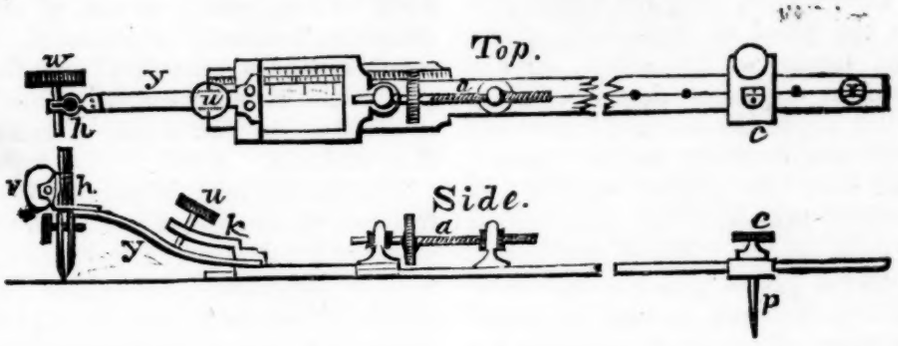
"By means of an apparatus of this kind, roots and other parts of plants may be steamed in a convenient and economical manner."

The relative advantages of steaming and boiling will very much depend, we suspect, on the extent of the establishment. We have tried both, though our steamer was imperfect; and have come to the conclusion, that when the number of hogs to be supplied does not exceed 15 or 20, boiling is preferable,—as with a good boiler, of the capacity of 30 gallons, from 12 to 16 barrels of food may be easily cooked in a day. But much depends on the judicious setting of the boiler, so that it may receive the whole advantage of the fire. For this purpose the brick work should be made to conform to the shape of the kettle, leaving a space of three or four inches between them, until it reaches nearly the top of the kettle, when a tier of brick set edgeways is projected for the flange of the boiler to rest upon; and the bottom of the fire flue should be above the bottom of the kettle, or about parallel with the commencement of the slope which rounds its bottom. By this means, the flame is thrown upon the sides and bottom, and in a manner that the whole boiler is collapsed with it on its passage to the smoke flue; and the brick work being heated constantly refracts back its heat upon the boiler. A tight cover should be laid over the cooking food, to prevent the free escape of the steam, by partially confining which, the cooking process is greatly facilitated.

There should be appended to the hog house an open yard, for straw, litter, weeds, &c., which the hogs, during summer, will work into manure, and into which the dung is thrown from the pen.

Hogs are subject to various diseases, particularly if shut up in a close pen, during the time of fattening, which are often suddenly fatal. Prevention is here easier than cure; and many farmers prefer giving their hogs yard room, where they can root in the earth, which is deemed a preventive. Others give them occasionally rotten wood, charcoal, sulphur, antimony or madder, all which are considered as aperients, cleansers or alteratives, and consequently as conducing to health. Salt is all important, and should be habitually blended with their cooked food.

TRAUTWINE'S BEAM COMPASS.



[From the Journal of the Franklin Institute.]

Description of a Beam Compass, contrived by JOHN C. TRAUTWINE, *of Philadelphia, Architect and Engineer.*

TO THE COMMITTEE ON PUBLICATIONS.

Having recently had occasion to draw several maps of railroad surveys, on a large scale, I was at a loss for a beam compass, of a length sufficient for striking the curves, and, in consequence, contrived, for that purpose, the one here described.

Finding it to answer in a very satisfactory manner, and thinking it might, in the absence of a better, be useful to others, I submit it for insertion in the Journal, provided it be considered of sufficient utility.

The instrument consists of a strip of brass, (mine is three and a half feet long, half inch wide, by one-twelfth inch thick,) having its edges rounded, to prevent its catching in any inequalities in the paper, and being divided and numbered into feet and inches, or in any manner that may be preferred.

Precisely in the centre line of the strip, and at each point of division, is carefully drilled a very small circular hole, entirely through the brass, and barely large enough to admit the finest sewing needle. Pains must be taken to drill these holes *precisely vertical.*

At that end of the beam where the numbering of the divisions commences, is a sliding vernier, by which the divisions may be subdivided into hundreths of an inch. This slide is moved along the end of the beam, by means of the screw, *a*, and is furnished with a holder, *h*, into which a pencil, or drawing pen, may be inserted. It has also a screw, *u*, which, by operating on the stiff piece of brass, *k*, above, and the elastic piece, *y*, below, forces the pencil, with any required degree of pressure, against the drawing. The lower piece, *y*, is elastic, that it may, by yielding, allow the pencil to play over any roughness, or knots, that the paper may contain; and is very essential to the drawing of a clear, unbroken line. *c* is a sliding piece of brass, with a point, *p*, and a semicircular hole, *o*, on top, (for seeing the dimensions on the beam.) It will often be found useful for ascertaining the centre of a circle by trial, when it is inconvenient to do so by calculation.

As the size and proportion of the parts of the slide, (particularly of the spring and pen,) are of great importance, and mine are the result of several trials, I have represented them at one-quarter the full size, to enable others to make them with certainty at the first attempt.

The drawing ink should be perfectly clean and free from dust, and of a certain degree of fluidity, which a few trials will point out.

The paper should be brushed with a clean handkerchief, to remove dust, before beginning to draw the curves.

The dimensions above stated I consider sufficient for beams six feet long, which gives a diameter of twelve feet, a size which is very rarely exceeded in neat finished drawings on paper.

For radii less than three feet in length, both the breadth and thickness of the strip may be reduced.

To use the instrument, having first found the centre from which the curve is to be described, drive a fine needle firmly and vertically into it; and over the needle,

place that division hole of the beam which more nearly corresponds with the required radius; after which, bring the pencil *precisely* to the point of beginning of the curve, by means of the screw, *a*; and after giving it a proper degree of pressure on the paper, by turning the screw, *u*, describe the curve by merely pushing the beam over the paper, without any other vertical pressure than what arises from its own weight. When one line is drawn, and the pencil is to be taken back, to commence another, it may be raised from the paper, either by unscrewing *u* a little, or by slightly lifting the whole slide. It will not be necessary to lift the beam off the needle, for the purpose of altering the position of the pencil, for drawing concentric curves, whose difference of radii does not exceed the play of the slide, as that may be done much more readily by the screw, *a*.

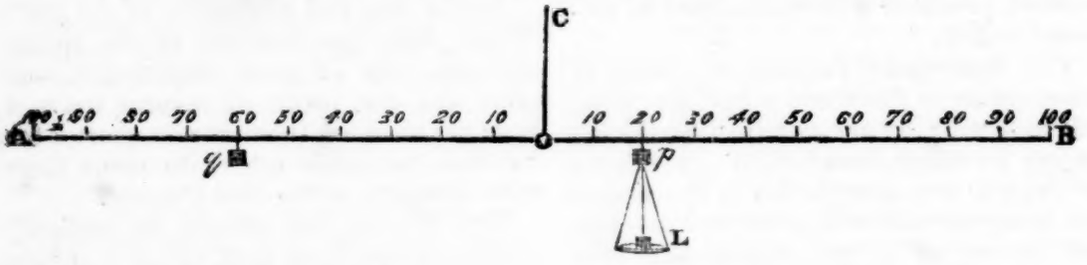
In this manner, any number of curves may be described from one point, without the least enlargement of the centre hole in the paper; a defect to which all other beam compasses I have ever seen, are liable. This is subject to so little spring, or irregularities of any kind, that I have, in the width of *one inch*, described *one hundred* concentric curves, *of seven feet diameter*, precisely equidistant, with as much neatness, accuracy, and clearness, as I could have drawn the same number of small ones, with a pair of common six inch dividers.

The instrument is peculiarly adapted to cases where the centre is on the same plane as the drawing, and where the beam will be supported throughout its entire length, or where it may be upheld by intermediate supports, sufficiently near each other to prevent any degree of sagging; but where it is impossible to support it between the centre and the pencil, it is not by any means to be recommended.

When the curves are finished, the needle may be easily withdrawn, either between the legs of a pair of common dividers, or between the blade and back of a penknife. A hole, *x*, should be made in the beam, for hanging it up.

These beams are kept ready made, for sale, by Mr. William J. Young, mathematical instrument maker, of this city.

MECHANICAL ARITHMETIC.



To the Editor of the Mechanics' Magazine:

SIR,—Permit me to lay before the readers of your Magazine, through its medium, a very curious way to perform the four principal rules of Arithmetic, viz. Addition, Substraction, Multiplication, and Division, by means of a balance. I came across it some time since, and was so much pleased with it, I thought I would send you a copy of it for your Magazine.

The balance may be made either of metal or wood; the arms two feet long each, and divided into one hundred equal parts from the centre each way.

Let any weight represent one or unity; for example, one ounce; one may in the same manner make use of the tenth part of an ounce.

Let the number 364 be applied to the balance. I apply 3 oz. to the hundredth division, and one ounce to the sixty-fourth part.

Let the arm of the balance be loaded any how; we determine what number is the value of that action by suspending at the hundredth division of the opposite arm a weight that may be increased sufficiently, by an ounce at a time, until it prevails. Suppose nine ounces will not yet make an equilibrium, but ten ounces

exceeds it; leaving the nine on, by moving one along the arm I seek for the equilibrium, which I find where the ounce comes to 47, so that the action required will be 947 in value.

To perform Addition—Apply the numbers given separately to one arm, and find the value of the action, as above directed, (see 3d sentence,) on the other arm.

Examples—34, 54, 268, 407, 45, 65, is to be added together.

I add these numbers separately to one arm, and find by trial that 873 is the number required.

Subtraction—From the sum of 567 and 258 take the sum of 489 and 56. First apply the first numbers to one arm, and then the other numbers to the other arm, and seek the value by finding an equilibrium, which I find to be 280, the difference.

Multiplication—Multiply 67 by 15. Hang the number 15 at the 67th division, and find the value as above, which I find to be 1005, the product.

Division—Divide 1005 by 15. Apply the dividend to the balance, and moving the weight 15 along the beam to find an equilibrium, which will be at the 67th division, the quotient.

The *Rule of Three* is performed by multiplication and division; but by this machine one operation is sufficient: 77 : 132 : : 63 being given, a fourth number proportional is required. Apply 133 and two decimal parts to the 63d division, (that is, I apply a weight equal to 132 to the 63d division;) then to the 77th division of the other arm I apply a weight which I change until I have the equilibrium; by thus trying, I find that a weight of 10 ounces and 8 decimal parts is required, which shows the number sought to be 108, the answer.

A B is the balance, whose arms each way are two feet long, and each divided into 100 parts, (see figure); *p g* are brass weights of one ounce each; L is a scale suspended by cords, which, with cords and all, should weigh just one ounce, and other weights as may be needed.

C is a thumb-piece to suspend the balance by, made with a joint like a common scale beam. The above may be properly called *Mechanical Arithmetic*.

S. A.

[From the London Mechanics' Magazine.]

MR. GALT'S SUBSTITUTE FOR STEAM POWER.—The following is an extract of a letter addressed by Mr. Galt, the celebrated novelist, to the Greenock Advertiser:—

"The fatal explosion of the Earl Grey steamer has induced me to try if the principle of my pressure-syphon could be applied to propel vessels; and the result has been so perfectly satisfactory, that I find myself actuated by humanity to make it public, that others may test the experiment, the simplicity of which is not the least of its merits.

"Take a cylinder, and subjoin to the bottom of it, in communication, a pipe—fill the pipe and the cylinder with water—in the cylinder place a piston, as in that of the steam engine—and then with a Bramah's press, and a simple, obvious contrivance, which the process will suggest, force the water up the pipe, the pressure of which will raise the piston. This is the demonstration of the first motion.

"Second—when the piston is raised, open a cock to discharge the water and the piston will descend. This is the demonstration of the second motion, and is as complete as the motion of the piston in the cylinder of the steam engine; and a power as effectual as steam is obtained without risk of explosion, without the cost of fuel, capable of being applied to any purpose in which steam is used, and to an immeasurable extent.

"The preservation of the water may in some cases be useful, and this may be done by a simple contrivance, viz. by making the cock discharge into a conductor, by which the water may be conveyed back at every stroke of the piston to the pipe, at the end of which the Bramah's press acts.

"My condition does not allow me to do more than to solicit that the experiment may be tested. Although no mechanic, I yet believe myself mechanician enough to see the application of the principle."

We give place to the following communication, and would observe that we know nothing more of the subject alluded to than what was contained in the Magazine. We should, however, like to see a specimen of the gun spoken of by our correspondent, Mr. Porter.

To the Editor of the Mechanics' Magazine:

Sir: I have observed, in the June number of the Mechanics' Magazine, (which, having been absent from home, I had not seen till the present week,) an article from the London Mechanics' Magazine, on the

subject of a gun with a revolving breech.—What there may be peculiar in the construction of this gun, I know not, but would inform the public—Mr. Cary in particular, should this meet his eye—that I have had on hand, for seven years, a rifle with a revolving breech, containing nine chambers, which are "brought into position by the single movement of elevating the hammer," and which has been discharged *nine* times in *seven* seconds. When I constructed this gun, I supposed it to have been original, and was about to apply for a Patent; but, learning that guns of similar construction had been in use several years in England, I gave no farther attention to the subject: yet it is here spoken of as something new. My rifle has a percussion lock, and may be suc cessively discharged without removing the sight from the eye; yet, of course, admitting deliberate aim at each discharge. I shall reconsider the subject, and if I find any evidence that any essential part of my plan is original, I may yet apply for a Patent.

Yours respectfully,

RUFUS PORTER.

Billerica, Mass., Sept. 24th, 1835.

[For the Mechanics' Magazine.]

SIR,—Every new invention, or improvement in an old one, cannot but be of interest to the farmer, when they are such as to lessen the cost of producing grain, and preparing it for market.

With this view of the subject, I take the liberty of introducing to the notice of farmers, "John Marshall's new and valuable improvement in the threshing machine," as it is styled in his patent; I think, however, it is misnamed, and should rather have been called a "screen," or rake. It is intended to, and will, undoubtedly, supersede the use of the common raker, as soon as its operations shall become known tc farmers. The following is a description of it, as near as may be given, without the help of a draught.

The screen is formed by taking three ropes, (of about half inch more or less,) double the length required for the length of screen, or distance the straw is intended to be carried, place them parellel to each other, about one foot six inches apart, or more, if the mouth of the machine require it, then pass through the ropes wooden or metallic rods, at such distance from each other, that the space between them shall not exceed half an inch, from end to end of the ropes, then join the ends of the ropes together, and thus an "endless revolving screen" is formed. This screen is made to pass around longitudinal pullies, placed in frames, (a suitable distance apart,) round which it revolves horizontally. To one of these longitudinal pullies, is attached a band wheel, by means of which the screen is attached to the horse power of the threshing machine, and made thereby to revolve with suitable velocity. The machine may be connected with any of the various patent threshing machines in use, and is what has long been with farmers a desideratum, viz.: a simple and cheap manner of separating the straw from the grain, perfectly clean, and conveying the straw to some place adjacent to the threshing machine. The straw with this screen, or raker, may be carried double the distance with half the expense of power, as with the old fashioned rake.

The machine, although simple, is of first rate importance to grain growing farmers. Not a kernel of grain is carried with the straw, which had been separated from the head by the threshing machine.

To all who are desirous of lessening the expense of preparing grain for market, this patent revolving screen, or raker, is confidently recommended.

With a slight alteration, the machine may be made to convey the straw on to a mow, or on to a stack or wagon, thereby saving the expense of re-handling by manual labor.

UNUS.

[From the Journal of the Franklin Institute.]

Specification of a Patent for a new and improved mode of constructing a Mill Bush, or Spindle Box, for Flour Mills; and also of making and fixing a Ring and Bale in the Eye of the upper Stone. Granted to WARREN P. WING, *of Greenwich, Hempstead county, Massachusetts, February* 20, 1835.

To all whom it may concern, be it known, that I, Warren P. Wing, of Greenwich, in the county of Hampshire, and

State of Massachusetts, have invented certain improvements in the manner of fixing the mill bush, or spindle box, and of constructing a ring and bale to be fixed in the eyes of millstones for the grinding of flour, or other articles; and I do hereby declare that the following is a full and exact description thereof.

I make a box, usually of cast-iron, which I adapt in size to the eye of the stone. For the sake of facility of description, I will give the dimensions of one which I have made, and which, after a fair trial, has been found to answer well in practice.

The box has a top, which top fits on to it, like a snuff-box. It is ten inches in diameter, and five inches in depth, the outer rim being three-fourths of an inch in thickness. The bottom and top are both perforated in the centre, so as to allow the mill spindle to pass through them. This box is to contain three bearing pieces, of block tin, or of any proper mixed metal, which are to be simultaneously forced up against the spindle, and which are in contact with it for about three-fourths of its circumference, the remaining fourth being exposed to the cooling influence of the air. These metal bearings are cast into a follower of cast-iron, a birds-eye view of which resembles the letter H, the outer end of which receives the cam, or eccentric, by which the bearings are to be forced up against the spindle. Cells to receive these followers are formed within the box, by six wings, or cheeks, extending from the top to the bottom, the sides of each of the three cells thus formed being parallel to each other, that the followers may slide readily and truly therein; these wings are, of course, cast with the box. The void space between them admit of the contact of air with the spindle, and one of them is to be used for another purpose, to be presently described.

Between the rim of the box, and the crossbars of each of the followers, the bottom is perforated to allow the passage of round rods of iron, the upper ends of which are formed into cams, or eccentrics, for forcing up the followers, and, for this purpose, extend up through the whole depth of the box. The lower ends of the above named round rods, or spindles, extend down sufficiently below the bed stone to allow of their being acted upon conveniently, as they are all to turn at the same time. The turning them simultaneously may be effected in various ways, but that which I deem the most simple is by attaching each of the spindles to a ring, by means of a jointed crank, so that, when the ring is made to revolve, the followers will all advance at the same time; other modes will occur to any skilful mechanician, and need not, therefore, be specified.

The cover of the box I make somewhat convex; it need not be more than one-fourth of an inch in thickness; besides the perforation in its centre for the spindle, I usually drill, or cast, holes through it, near the inner edge, which I fill with wood, in order to nail the elastic collar thereto.

In order to lubricate, or oil, the spindle, I drill a hole through the bottom of the box, near the periphery, and in one of the angles formed by it, and one of the before named wings, or cheeks, in one of the void spaces. A rod extends down through this hole, in the manner of those attached to the eccentrics, and this carries a leaf within the box, to which a sponge containing oil, or a lump of grease of any suitable kind, may be attached. By turning this rod, the oil, or grease, is brought into contact with the spindle, and lubricates it; and this may be done in a moment, as often as it is found necessary.

My improvement in the bale and ring consists in casting them in one entire piece, in such way that the ring may be let into, and firmly affixed in, the eye of the stone. The bale rises as a semicircle above the ring, or forming such other curve between two opposite points on the diameter of the ring, as shall adapt it to the cock heads of spindles already made. Gains, or notches, are made under the ends of the bale, in the ring, to receive the driver.

What I claim as my invention, is the construction of a spindle box, in which the followers are moved up by eccentrics, or cams, without the necessity of stopping the mill, and operating substantially in the manner described.

I also claim the arrangement for lubricating, as herein described, and likewise the manner of constructing the ring and bale in one piece, as herein set forth; not, however, intending to confine my-

self to the exact form which I have described, but to vary the same in any manner which I may think proper, whilst the like ends are attached by means substantially the same.

WARREN P. WING.

THE LEXINGTON.—We observe in the London Mechanics' Magazine for August, an account, by "an American," of the *Steamboat Lexington*, which was constructed for, and under the direction of, Capt. VANDERBILT of this city, rating her at 20 miles per hour, and calling her "the fastest vessel in the world."

This communication called out several others in reply, from which we select the two following, and would ask from Capt. Vanderbuilt, or some one else, a drawing, and such a description as will put the matter at rest, to the satisfaction and credit of all concerned.

Extract from a communication in the London Mechanics' Magazine, signed "James Barstow."

THE AMERICAN "FASTEST VESSEL IN THE WORLD."—Sir: As the account sent you by "an American," of the Steamboat Lexington, and inserted in your journal of Saturday last, does not explain with sufficient clearness the peculiar mode of construction by which she has been enabled to accomplish a degree of speed, hitherto quite unrivalled, and by many deemed utterly unattainable, your readers may be, perhaps, pleased to receive from another American some further particulars on the subject. I have not myself seen the Lexington, but my information respecting her is from a good source.

THE AMERICAN "FASTEST SHIP IN THE WORLD."—Sir: I have read an extract from an American paper, in your last Number, p. 384, giving an account of the trial of the Lexington steamer. I do not quite understand the construction of her deck; and should be glad to receive further information by a sketch in your Magazine. Neither do I comprehend how she could move at the rate of 20 miles an hour, seeing the greatest velocity of her paddle-wheels is but 19.7064 per hour. Perhaps your printer made the error, in stating the diameter of the wheel at 24 feet; surely it should have been 34 or 42 feet: it is in vain to expect an engine with a stroke of 11 feet to make more than 23 per minute; indeed, this speed for the piston is greater by far than is usual in England; so that the speed of the vesse must be attained by increasing the diameter of the wheel.

Under this idea, I do hope your correspondent will write for a more detailed account of the Lexington and her engines, for at present she looks a "trifle slanting-dicular." At the same time, I am ready to acquit your correspondent of any personal intention of misleading your readers.

I am, Sir, yours truly,

W. THOROLD.

Norwich, August, 22, 1835.

Sir: Having read in your valuable journal for August 15th, an account of the "fastest boat in the world," I was induced to look minutely into the description given; and upon comparing the diameter of the wheel with the number of strokes mentioned, I find that the speed of the boat (which is stated to be twenty miles per hour) is two miles an hour faster than the motion of the periphery of the wheel!

Now, Mr. Editor, I take upon myself to say, that no steamer in this counrty has approached, within some miles, the speed of the diameter of the wheels. The "Diamond," "City of Canterbury," and "Star," now running in the Thames, are no doubt the three fastest boats in Europe; the speed of these boats, is as near as possible, thirteen geographical miles per hour, during which time the periphery of the paddle-wheels moved seventeen miles, travelling four miles per hour faster than the vessel.

Now in the description of the "fastest boat in the world," the diameter of the wheel is given at twenty-four feet, and the speed twenty-one to twenty-three strokes per minute; I have taken the mean of twenty-two strokes per minute; this gives, for the speed of the wheels, eighteen miles per hour, and deducting four miles, as is the case with the three boats before mentioned, will leave fourteen miles per hour; but I wil not allow the Americans even this speed, for two reasons; first, it will be observed that I have founded my previous observations upon three of the fastest, as well, perhaps, as the best boats in this country, both as regards engines and construction, which is the reason that the speed of these boats approaches so near the speed of the wheels; for if the average of thirty boats on the Thames be taken, we shall find that the wheels are often going fifteen miles an hour, while the boats are going only ten miles. Again, the lumber, which is used in American boats, and called steam engines, can never be compared with the engines as now manufactured by our first-rate

makers, either for lightness, safety, or effective force. Taking all these facts into consideration—facts which are well known to scientific men in this country—I think we may allow the American boats a speed approaching thirteen miles an hour, and not more; and this speed is not produced by the eleven-feet stroke or the arched deck and beams, but from the simple fact of her enormous length, as compared with her beams. Vessels of this class may do very well for the large rivers of America, but never would do for sea service, or for the rivers of this country.

As I find in your last number, *another American* has been giving his countrymen a fillip, by endeavoring "to explain more clearly than your former correspondent has done, why this boat has attained this wonderful speed," but which explanation only shows the manner in which she is trussed longitudinally; perhaps he will now have the goodness to explain, why in America steam ships go *faster than their wheels*, while in all other countries they generally go from one third to one fouth slower.

I am, Mr. Editor,
Your obedient servant,
FANQUI.

I send you, Mr. Cultivator, the first of a series of "*Letters from a Father to a Son*," and intend to send you others, should this be thought worthy of a place in your paper, as leisure may permit, or inclination prompt.

PRELIMINARY.

Dear Son,—At no time in life do we stand more in need of parental counsels, or are more likely to be benefitted by them, than at the period when we are throwing off the boy, and are about to assume the cares and responsibilities of manhood. Youth are accustomed to look only upon the bright side of the picture; their anticipations are sanguine; their hopes ardent; and they need to be brought often to consider the sober realities of life, to check their unreasonable aspirations. They see not the sands and breakers which begird the ways of life, and upon which very many are early shipwrecked. They need the experienced pilot. Having served in this capacity for a score or two of years, in the school of experience, where all *may* learn, though all *do not* learn to profit, and being deeply interested in your future welfare, I propose to make over, for your use, some of the lessons which I have been taught in the school where yet you are but a noviciate. They constitute capital, if put to good use, and will be sure to make good returns, in the multiplied enjoyments of life. These will be given as they occur, without regard to arrangement.

Learn early to depend on yourself. Your physical and intellectual powers must be your main dependence for fame and fortune. The ground has been fitted for the seed. Your hands have been taught to labor; your mind to reflect. You must be the husbandman: you must sow the seed and nurture the plants; and the reward of the harvest will depend upon your personal diligence and good management. If you sow tares you cannot reap wheat; if you sow idleness you *will* reap poverty; for however abundant the parental bequest, few can retain wealth who have never been accustomed to earn it.

Beware of extremes—the *two* often meet; and by following the one too far, we often insensibly slide into the other. Thus prudence may run into parsimony; patriotism into peculation; self-respect into pride; and temperance in our habits into intemperance in our partialities, prejudices and passions. While you claim and exercise, as the high prerogatives of a freeman, the free expression of your political and religious opinions, and the right of disposing of your time and property in any way, that shall not infringe upon the rights of others, nor compromit the peace and good order of society, forget not to respect the same rights in your neighbor, whom education or association may have imbued with opinions differing from your own. Reform others by your example: for you can never make a sincere proselyte, in religion, politics or morals, or even in the arts of labor, by *coercion*. You may compel men to become hypocrites, sycophants, and servile imitators, but you do it at the expense of the best feelings that dignify our nature—at the expense of piety, patriotism and self-respect. Be moderate in all things—in your pleasures as well as in your toils—in your opinions and in your passions. Past experience should teach you, that your opinions may honestly change; and however long you may have cherished wrong ones, or obstinately defended them, to renounce error, when palpable, will reflect lustre upon your character. As it is human to err, so it is magnanimous to confess and renounce one's faults.

Intermeddle not officiously in the affairs of others. Your own concerns will demand all your care. Those who busy themselves with other people's business, seldom do justice to their own. Seek for enjoyments in the domestic circle, and make home agreeable to all around you. This is your duty as well as interest. Seek rather to be good than great; for few *can* be great, though all *may be* good; and count the ap-

probation of your own conscience, above the applause of the multitude. Act in secret as you would in public—as though your motives were scanned by those around you — and you will seldom do wrong. Adieu.—[Cultivator.]

Apprentices.—The following statement from the Wiscasset Intelligencer, shows the duty of apprentices, and the liability of those who entice them from their proper place of business.

A case was tried in this town, in the Supreme Court, which is of considerable importance to masters and apprentices. The action was brought by the plantiff against the defendant for enticing away and employing an indented apprintice—which was clearly proved. The judge, in charging the jury, stated clearly and eloquently the law on this subject, and the necessity to society of apprentices being steady and faithful to their masters, and that the latter should discountenance every encouragement of apprentices being disobedient and refractory, by refusing them employment. We understood the judge to say, that masters were liable for damages, when they employed or harbored runaway apprentices, whether bound or not, if it could be proved they left their employers without good and sufficient cause. The jury in the above case awarded the plantiff a hundred and twenty-five dollars damages.

If I was He.—If I was a Farmer, I would devote my whole attention to the cultivation of my farm, clothe and feed my servants well, take care of my stock, mend holes in my fences, take a fair price for my produce, and never indulge in idleness and dissipation.

If I was a lawyer, I would not charge a poor man five dollars for a few words of advice.

If I was a physician, I could not have the conscience to charge as much as they do for feeling the pulse, extracting a tooth, taking a little blood, or administering a dose of calomel and jalep.

If I was a merchant, I would have an established price for my goods, and not undersell or injure my neighbors; I would sell at a moderate profit, giving good weight and measure, and deal as honestly as possible.

If I was a mechanic, I would apply myself industriously to my business, take care of my family, refrain from visiting taverns and grogshops; and when I promised a man to have his work done by a certain time, I would endeavor to be punctual.

If I was a young buck, I would not cut as many ridiculous capers as some do—playing with watch chains, flourishing with their rattans; stamping on the pavements with their high heeled boots, [probably not paid for,] and making remarks on plain and worthy people. They render themselves contemptible in the eyes of the sensible and unassuming.

If I was a young lady, I would not be seen spinning street yarn every day, ogling this young fellow, nodding at another, and giving sweet smiles to a third—sometimes having three holes in one stocking and two in the other.

If I was an old bachelor, I would make every exertion in my power to get married, and if I failed I would buy a rope and hang myself.

And finally, Mr. Printer, if I was one of your useful and respectable profession, I—would never trust my paper in a lawyer's hands, and never refuse publishing a piece like this.

N. B.—If I was a subscriber to a newspaper, more particularly such a valuable newspaper as you publish, I would pay for it like an honest man. If I was not a subscriber, I would subscribe for it immediately, and to save trouble comply with the terms.—[Maine Farmer.]

Durable Whitewash.—I am enabled to certify the efficacy of marine salt in fixing whitewash made of lime. In the year 1795, when I was director of the naval artillery at the port of Toulon, I was commissioned to ascertain the utility of a method proposed by the master painter of that port, M. Maquilan, for whitewashing the ships between deck, and likewise their holds, in a durable manner, by means of lime. Our report was in favor of this process, which consists in saturating water in which the lime is slacked with muriate of soda, (common salt.) The whitewash produced by it is very permanent, does not crack, nor come off upon one's hands or clothes. The experiment was made only on wood. It appears from M. St. Bernarde's account, that it succeeded equally well on walls.—[Annales des Arts et Manufactures.]

South Ferry.—The Long Island Star says—We are gratified at being able to inform the public, that two boats, each upwards of 150 feet in length, are now being built for the South Ferry, between Atlantic-street and New York. The Jamaica Railroad which terminates at this ferry, will soon be completed.